JUL 27 1923

Place and Function of Storage Battery Locomotive Is Discussed on Pages 129-132.

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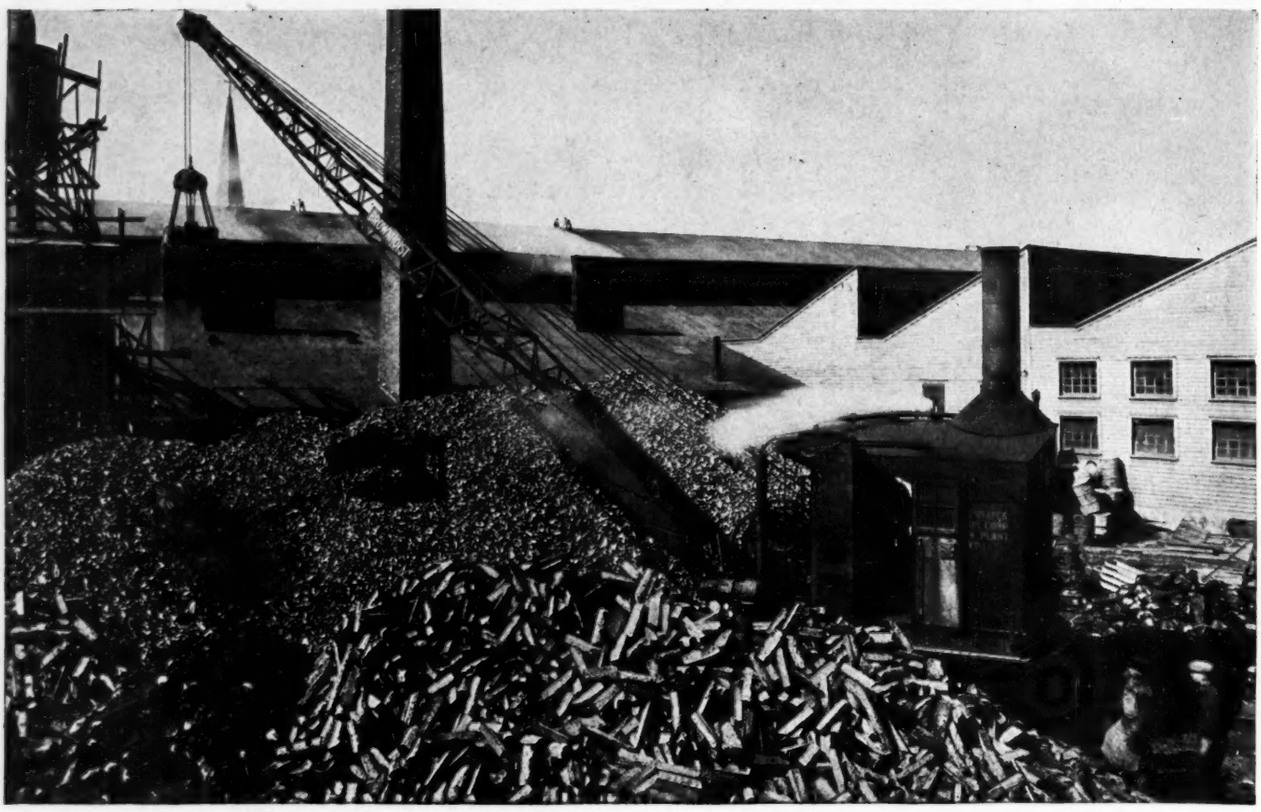

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COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24 NEW YORK, JULY 26, 1923 Number 4

Relativity

SOME time ago we pointed out that if the U. S. Coal Commission failed to make comparisons between coal and other industries it might create a wrong impression on the mind of the public, for most people have obsessions which can be shaken from their minds only by the use of actual data. They have, in short, a grievously defective yardstick and cannot measure anything correctly.

Some men, for instance, who have been reading with diligence about the bricklayers and plasterers in big cities have brought themselves to believe that wages in general are much higher than they really are and those whose contact with life brings them in touch with farm laborers and iron-mine workers of Pennsylvania and New Jersey are prone to set the average day wage too low. Similarly those who have steady jobs themselves do not realize in how many industries the men do not know from day to day whether there will be work tomorrow. All our judgments are comparative, and it is necessary for a true judgment that comparisons be broad and that they be chosen so as to illustrate similar conditions.

The U. S. Coal Commission has realized that without comparing coal mines with other industries no adequate presentation of facts in any one industry can be made, but where is the information and where could they obtain funds for such an inquiry into other industries? The funds were not provided nor could they be obtained. The Commission realized that it had a job already too large for the time and force available without any extension of any sort into adjacent fields. What information was available was not used. It was left for each reader to furnish his own yardstick, his own table of wages, of profits, of hours, of turnover and of stability of operation and so forth.

But there was one exception. The Commission in its anthracite report allowed itself to say, using terms of comparison: "Thus in ten years both the retail and the wholesale prices of stove coal have practically doubled. This is in line with the general advance in commodity prices, except that while the wholesale price of metals reached its peak in 1917, of chemicals in 1918, of farm products in 1919, and of other commodities in 1920—all with subsequent declines, usually large—the price of anthracite has continued steadily upward."

All of this is unquestionably true, but nevertheless it is highly misleading. The wholesale price of metals was excessively high in 1917, almost three times the pre-war price; the price today is inadequate. This is admitted by everybody. Furthermore, it is low today because wages are lower than during the war, and taking a table prepared by the *Engineering and Mining Journal-Press* and striking an average of wages it will be found that the increase since 1914 has been only 29 per cent on day laborers above and below ground alike.

In that same period conditions were markedly different in the anthracite industry. The wages have been raised more than 29 per cent, no new cheapening process like flotation has been introduced, and there has been no narrow market to make it obligatory, as in some parts of the metal industry, to operate at a steady loss or entirely close down. Consequently the trend of the anthracite market has not been like that of metals —copper, for instance. The copper industry closed down for months and since it has resumed has been wondering if it did well to start up again. Whereas wages in the metal-mining industry declined after the war, those in the coal industry increased, and by the Commission's own showing the wages of contract miners are now 76 per cent higher than in 1914. The wages of company miners since that time have risen 138 per cent and of outside labor 181 per cent.

It must be confessed that the Commission has fallen on a comparison that is unfortunate. We trust its future comparisons, if made at all, will be more explanatory and more diligently elaborated or, at least, more carefully chosen.

The Sacred Contract

JOHN L. LEWIS' strident denunciation of the Nova Scotia local of the United Mine Workers that will not do his bidding is striking proof of the everlasting sanctity of the contract once that organization has put its name to it. The papers ring with praise for the union that thus holds to its word. These "red" mine workers in the far-off corner of Canada have struck when their contract has not expired, when all they have as an excuse is sympathy for union workers in another place who are on strike. They are unceremoniously fired out of the holy of holies and a provisional president is sent from the head office to teach them what discipline means.

Fine! But what about the broken contracts that John L. Lewis will not see? Every district has them—Indiana, Kansas, Illinois in particular. They are the commonest things there are in those fields, so common that they are numbered by the hundred every year, so common they seem to have become commonplace. A constant source of annoyance to the operator, disrupting discipline, breeding discontent and destroying confidence in any contract, these local strikes are in violation of the same contract the breaking of which in Nova Scotia is so mercilessly scored. Nothing is done about them.

When the operators last January met with Lewis in New York to negotiate and sign a new contract for the remnants of the Central Competitive Field, they urged one little concession. They wanted Lewis to concede that he would condescend to recognize these troublesome local strikes and to sit as judge over their settlement. The operators were willing to have the president of the United Mine Workers arbitrate the disputes at these mines when they should have passed

beyond the point of local settlement. The operators wanted action and not delay and disturbance. But Mr. Lewis told them that he could have nothing to do with such trivial matters. Should he have agreed to take jurisdiction, and it was and is entirely a matter of his option, he would have had to compel observance of contract; he might have had to discipline some local presidents and higher officials. His popularity is not too great in those areas and it would have been needlessly stirring up a hornets' nest.

So now with a blare of trumpets and the proper amount of press agenting, he picks on little Nova Scotia, which does not matter much anyway, and tells the world that the United Mine Workers always keep their sacred contracts.

Planning a Nation's Transportation

WHEN the railroads in April agreed on a "program to provide adequate transportation" they set the peg higher than most observers outside the railroad field considered necessary. They were the real optimists on the season's prosperity. Yet each month since then the business that has been offered to the carriers and handled with little or no difficulty has exceeded their estimate. For instance, the anticipated loadings of all freight for the first six months of the year were some 23,500,000 cars, whereas the actual loadings in that period were slightly over 24,000,000 cars. Not only has the total for a six months' period set a new high record but in the last week of June a new high weekly record of 1,021,770 cars was registered.

In other respects have the railroads justified the assertion of C. F. Carter in an address in New York last week that the roads "have come back." In new equipment put in service the figures are large, and incidentally explain a large part of the activity of the iron and steel industry, which in turn has reacted to make more business for the roads. In but two months of the past six have the new locomotives placed in service numbered less than 300 and of new freight cars less than 12,000. Coal cars to the number of 31,744 have entered road service in these six months and some 39,000 are yet on order. On July 1 the number of all freight cars and locomotives awaiting repairs was the lowest in more than two years. Since February the number of tons of freight per car has been above the best record of 1921 and the reports of average miles per car per day is consistently above previous records. Freight is moving freely; with all the heavy traffic there is little or no congestion.

On top of all this the steam roads have added some 4,000,000 net tons of coal to their reserve piles in the six months ended with June. The engine coal in stockpiles has steadily grown from less than 4,500,000 tons on Jan. 1 to more than 8,000,000 tons on July 1. More than 2,000,000 tons above current requirements was taken by the railroads in June.

Here we have a modern exhibition of what can be done by intelligent planning on a national scale. The railroads have not accomplished these things alone and unaided. They have had the backing of the government at Washington and of industry generally. Almost driven to the wall by the loud and insistent demands of the "railroad baiters" that since private management had fallen down the government must take over their operation, the men who run the roads have shown of what they are made, bringing back their time-honored prestige for accomplishment. The coal industry is being ruthlessly pushed into the same branding stall that once held the railroads. It, too, is an industry that can do things and there are ample signs that the National Coal Association is doing that kind of forward looking that is bringing the railroads out of the hole.

New Methods Need New Public Viewpoint

JUST as everyone is saying "Do it by machine. Eliminate labor. Relieve the workman from grinding toil," comes the inquiry, What is the labor cost of production? How much does labor get out of the selling price?" also "What is the relation between net cost and market price?" The public is anxious to see machinery introduced, is desirous of economies from that source, but still insists that there shall be a minimum margin between labor cost and selling price, suspiciously questioning and bitterly resenting any growth in that differential.

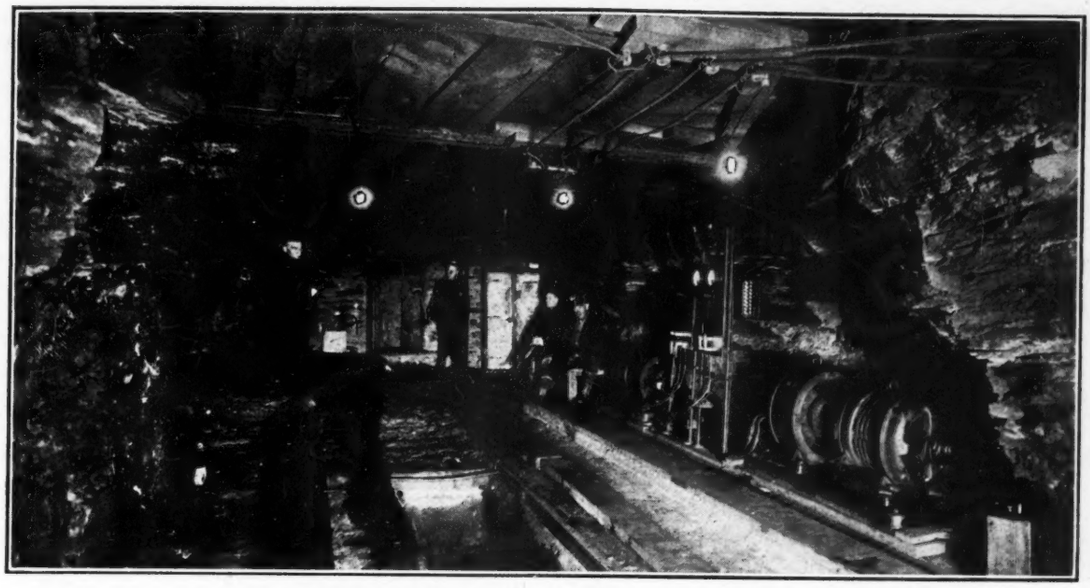
This attitude is not encouraging to the producer whose industry is tainted by public interest. The public begrudges paying him interest on capital invested and on money borrowed, yet at the same time the elimination of labor in industry can be accomplished only by the introduction of machinery, and when much machinery is used the difference between labor cost and selling price should increase. The railroads and mines have boasted that 70 per cent of all costs are for labor. Is that a credit or a debit? Should not our endeavor be to create such automatons in our industry that the labor quota is a much smaller factor than 70 per cent? When it is done the public, it may be supposed, will still insist that the installation of machinery and the return on the capital shall not be considered in the setting of costs, but if the public should take that view there will be an end to progress.

Young communities are the aggressive ones. The channel of commerce with the older nations is blocked by inhibitions till the current grows sluggish. Fortunately, the U. S. Coal Commission is somewhat more considerate and has taken the view that the increase in anthracite revenue may rightly mirror the greater investment on mining equipment, and thinks that if that is so or if prices before the war were too low no exception can be taken by the public. These statements exhibit the cold sanity of the Commission, but the public cannot see the investment even though a funded charge on production—unless it has itself invested, and so investment lags, and with investment the introduction of machinery.

Shall we listen to public clamor and so hedge in coal production with unfavorable rulings that operators will no longer say "Do it with machinery" but "Do it with labor, for only labor charges will be allowed"?

Confusing Publicity

BLOOMFIELD'S Labor Digest, "The Personal Service for Executives," published by Meyer Bloomfield and Daniel Bloomfield, was recently sent us for review. In the issue of July 7, 923, under a 24-pt. caption "The Coming Coal Strike" we read: "Unless the situation changes very much between now and the first of September, strikes may be looked for both in the anthracite and *bituminous coal* fields."



Storage Battery Charging Station, Ridgewood Mines, Traders' Coal Co.

Advantages and Reasons for Increased Application Of Storage-Battery Locomotives to Mining

Mining Conditions Create a Demand for Storage-Battery Locomotives—Economy in Mining Realized by Their Use—Storage Battery the Power Plant—Quick and Simple Calculations for Determining Battery Capacity

BY EDGAR J. GEALY
Electrical Engineer; Associate Editor, *Coal Age*

IN ALL industries in which the electric industrial locomotive has been adapted it has played an important part in the solution of material-handling and haulage problems.

The outstanding advantages of the electric locomotive may be summed up as follows:

(1) Consumes power only when in actual operation.
(2) Can be run by one man without special training.
(3) Is ready at all times for immediate use.
(4) Has large momentary overload capacity.
(5) Has simple and easily operated control.
(6) Has low maintenance cost due to small number of wearing parts.
(7) Requires attention only when in use.
(8) Can be run in places where smoke and fire risk of a steam locomotive would forbid its use.

During the last few years the storage-battery locomotive has won a lasting place in the coal-mining industry. It is particularly adaptable to gathering service and all underground service where there are difficulties in erecting and maintaining trolley wires and in bonding the rails, or where wooden rails are used. It also is suited for roustabout haulage when mines are first opened or when the mines are idle and construction and inspection work must go on.

Besides the more general advantages of electric haulage, the storage-battery locomotive has several additional advantages peculiar to itself. These may be briefly enumerated as follows:

(1) It eliminates the need of trolley lines and of bonds on any track over which it runs.

(2) In thin coal it is unnecessary to brush the top or take up bottom to make room for mules.

(3) No time is lost in making cable connections with the trolley line on entering rooms or in splicing the reel cable when it is cut.

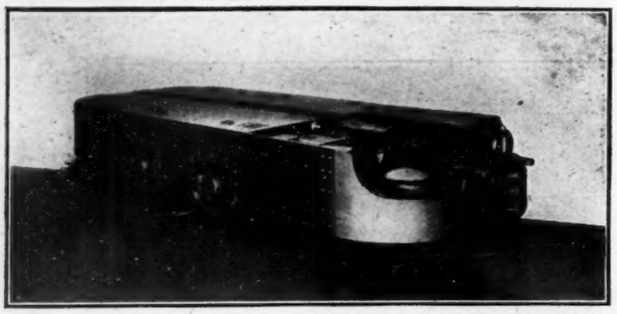
(4) Wherever used it eliminates the danger of personal contact with the trolley line.

(5) In a gassy mine, away from the headings, there is no danger of spark at the wheels or at the trolley.

(6) It is independent of either substation or power plant, so that it may be used when other operations have ceased.

(7) The speed and haulage capacity of the locomotive will enable it to displace from five to eight mules and eliminate the cost of three to five drivers.

In this connection it has been found that a storage-battery locomotive may originally be placed to eliminate from six to ten mules but in a few months if one were to ask how many mules would it take to replace the locomotive the answer probably would be ten to sixteen; due to the fact that the operations usually expand quite rapidly as soon as the storage-battery locomotive has become understood and properly handled.



EXTREMELY LOW TYPE BATTERY LOCOMOTIVE
Wherever the veins are thin, the storage-battery locomotive has a marked advantage over any other type of haulage device. This locomotive is only 25 in. high.

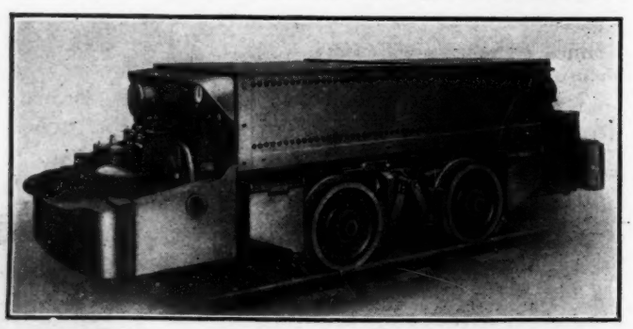
The mining type storage-battery locomotive should be simple in construction, accessible, rugged and, above all, efficient. All storage-battery equipment should be so designed as to draw as little energy from the battery as possible for a given amount of work. This must be true at all times and under all conditions so as to conserve the battery energy. Sparkless commutation, great overload capacity, and a maximum torque per ampere also are important factors in the motor design.

Mechanically, the motor must have great strength and durability combined with accessibility and careful elimination of excess weight. The control equipment should be devised with a view to reducing to a minimum the rheostatic losses. To obtain this end combinations of series and parallel groupings of the motors and motor fields should be used. Such economies as may be obtained will permit either the use of a smaller battery or the hauling of more cars per day. In either case there is a lower investment for a given output.

The storage battery is the most important part of the locomotive; it is the power plant of the system and therefore must be properly proportioned for the work to be done. Like the main power plant of any electrical system it represents a problem of capacity and maintenance.

Therefore the storage battery should have sufficient capacity to properly perform its duty cycle and must not have so great an abundance of overcapacity that it may be said that the locomotive is continually carrying around tomorrow's battery. If additional weight is required it may better be in the locomotive frame, where it will add more strength to the locomotive and consist of material far cheaper than battery weight, which must be replaced whenever the battery has run its life.

The conditions under which a storage battery has to operate when used on a locomotive in mining service are different in many respects from those experienced in any other class of work and therefore require that the battery be chosen and installed with special reference to these conditions.



LOCOMOTIVE WITH WHEELS ON TAPERED AXLE
To facilitate the removal of wheels this locomotive is equipped with wheels on a tapered axle held in position by a locked nut.

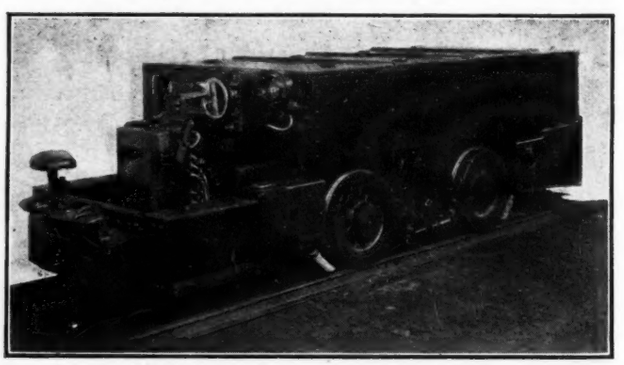
It has been suggested that the cells of a storage battery be so mounted on the locomotive that the flat of the plate comes against the direction of motion. The plates being assembled in the jar in this direction no opportunity is afforded for displacement; the inertia of the plates during a violent bump is transmitted through the cushioning effect of the electrolyte against the flat of the plate.

The claim is made that if mounted with the edge of the plates against the direction of motion, the cushioning effect of the electrolyte is lost, the shock is first transmitted to the jar through the connecting post and cell cover, and this may be followed by a hammer blow between the edges of one or more plates and the side of the jar, with resulting broken covers and broken jars. This point doubtless becomes of more importance as the ratio of battery weight to total locomotive weight increases.

The trays in which the cells are mounted should be provided with sufficient partitions so that the cells at the ends of rows will not be subjected to the inertia of cells behind them.

Furthermore, the trays should be thoroughly insulated from the frame of the locomotive, which is accomplished by the use of rugged insulators.

Holes should be provided in the bottom of the battery compartment in order to permit drainage and the breaking loose of any foundations between the tray and the iron of the locomotive, as such formations create leaks which tend greatly to reduce the capacity of the battery available for work.



PERMISSIBLE STORAGE-BATTERY LOCOMOTIVE
May be used in gaseous mines. Access to the motors and gearing is made easy by rotating the battery box while mounted on the locomotive.

The determination of the battery capacity represents the most important problem that the mining man must solve before selecting a storage-battery locomotive. This, in fact, is perhaps his only problem after he has determined the advisability of obtaining a storage-battery locomotive for a given work, because the locomotive details of all reputable manufacturers have now become quite generally established along definite lines which assure the many desirable features being incorporated.

The duties of a proposed storage-battery locomotive cannot always be definitely outlined. One of the reasons for this is that the electrical engineer rarely has control over the output of a given section of the mine in which the locomotive is to operate. Another reason is that it frequently happens that mining conditions change materially during the development of a section and even between the time the battery estimate is made

and the locomotive placed in operation. It occasionally happens that when the locomotive is received it is put into an altogether different section of the mine than that considered in the original battery estimate.

Nevertheless it is always necessary to make at least a rough estimate of the duty of the locomotive. In this event if the work divides itself into one definite cycle of operations repeated several times during the day, the calculation of the battery is simplified; but even when the work does not so divide itself a fairly close estimate may be made if the work to be done during the day can be outlined.

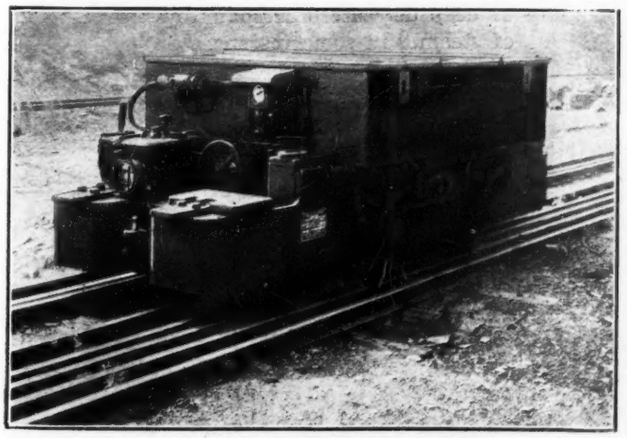
In the preliminary estimate of a battery for a storage-battery locomotive it is well to remember certain well-established limits which must be considered. Storage-battery locomotives as a class are designed for speeds about one-half those used on trolley locomotives. A 4-, 5- or 8-ton locomotive runs at about 3½ miles per hour at rated drawbar pull; a 10-ton at 4½, a 15-ton at 5 and a 30-ton at 5 miles per hour at rated drawbar pull. The usual storage-battery locomotive is rated at 80 volts but is usually equipped with a battery of somewhere near 48 cells of the lead type or about 80 cells of the nickel-iron type.

The average tractive effort which must be exerted at the wheels of a storage-battery locomotive to overcome the total resistance of various forms of friction which are present in mine haulage on either level or graded track is 30 lb. per ton of 2,000 lb. In addition to this the tractive effort for each per cent of grade is 20 lb. per ton.

Therefore each section of the haulage system must be separated with respect to the grades encountered and the tractive effort per ton on each section determined. If the load must be taken upgrade the tractive effort for the grade is added to that for friction. If the load is to be taken downgrade the tractive effort for the grade is subtracted from that for friction.

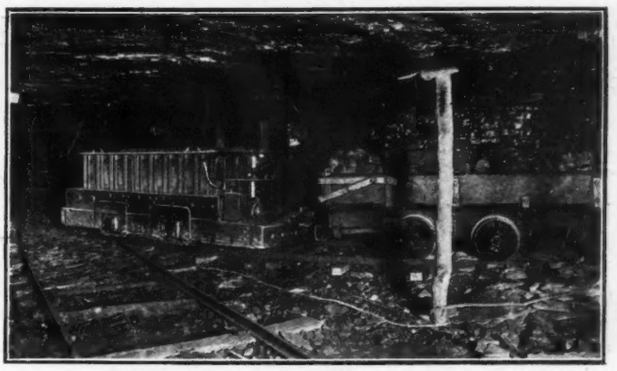
Obviously if a downgrade greater than 1½ per cent is encountered it would permit the load to coast down the grade without the use of power. Since but little of the surplus tractive effort above that required to overcome friction on a heavy grade is available in the next section no allowance is made for this surplus energy. Long trains tend to act as levelers of gradients but in the battery calculations the load is assumed to travel over the system as a concentrated weight.

The tractive effort for the train—locomotive included



BUILT ALONG APPROVED LINES

Much of the standard trolley locomotive equipment has been used in this compact storage-battery locomotive. This is a feature of great importance where capital in repair parts must be kept at a minimum.



ELIMINATES TROLLEY, FEEDER AND BONDING MATERIALS

This storage-battery locomotive works in a large section of a mine where the expense of trolley, feeder and bonding equipment would have been enormous.

—is obtained by multiplying the tractive effort per ton in each section by the weight of the train in tons. Multiplying the tractive effort for the train in each section by the distance traversed in the section gives the foot-pounds of work done by the locomotive in the section.

The energy at the wheels of a storage-battery locomotive is assumed to be 66⅔ of that taken out of the battery, therefore to determine the foot-pounds of work done by the battery we must multiply the foot-pounds of work done at the wheels by 1.5.

$$\begin{aligned} 1 \text{ hp.} &= 33{,}000 \text{ ft.-lb. per min.} \\ 1 \text{ hp.-hr.} &= 33{,}000 \times 60 \text{ ft.-lb.} \\ 1 \text{ watt-hr.} &= \frac{33{,}000 \times 60 \text{ ft.-lb.}}{746} \\ &= 2{,}652 \text{ ft.-lb.} \end{aligned}$$

Therefore dividing the total foot-pounds required from the battery for each section by 2,652 ft.-lb. gives the watt-hour output of the battery for that section. Obviously the sum of the battery outputs per section gives the total capacity required from the battery for a cycle, from which the total daily capacity may readily be determined.

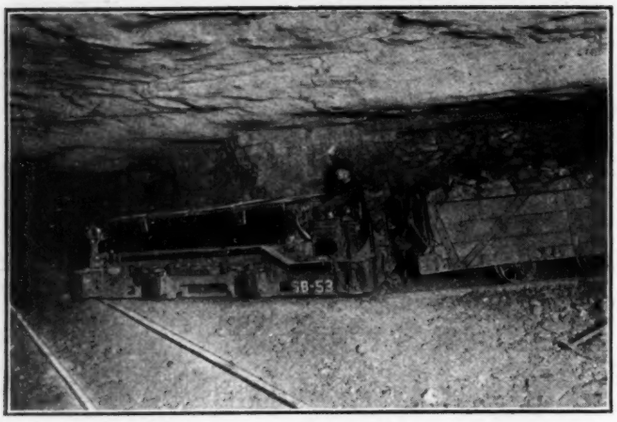
Dividing the total watt-hours by the voltage of the battery (the number of cells multiplied by 2 for a lead cell and the number of cells by 1.2 for the nickel-iron cell) gives the total ampere-hour capacity of the battery.

The watt-hour capacity of all cells can be obtained from any storage-battery manufacturer and the selection of the battery can thus be made to meet the requirements of the locomotive.

Dividing the ampere-hour capacity of the battery required by the ampere-hour capacity per positive and negative couple in the particular type of cell under consideration will indicate the number of positive plates in the cell to be used. The number of positive plates times 2 plus 1 gives the total number of plates in the cell.

The ampere-hour capacity per couple for any type cell easily may be obtained by dividing the ampere-hour capacity of a 21-plate cell by 10. For example, a 21-plate cell of 350 amp.-hr. capacity has a couple capacity of 35 amp.-hr. To compare different types of cells it is necessary first to put each type of cells on the same hour discharge basis. To illustrate the simplicity of this method of calculating the necessary battery capacity for a storage-battery locomotive let us assume the following problem:

A haulage system consists of 900 ft. of level track



GATHERING WORK IS DONE QUICKLY

Dependability is of prime importance to the mine operator. Placing the cars quickly maintains a high morale among the miners.

and 1,200 ft. of 1.4-per cent grade against the loaded train. The locomotive weighs 5 tons, the loaded trailing weight is 18 tons and the empty trailing weight is 7 tons; 25 round trips per day.

The complete cycle may thus be divided into four parts:

First section—23 tons on level for 900 ft.
Second section—23 tons on upgrade for 1,200 ft.
Third section—12 tons on level for 1,200 ft.
Fourth section—12 tons on downgrade for 900 ft.

The tractive efforts are as follows:
First section—30 lb. per ton.
Second section—30 + (20 × 1.4) = 58 lb. per ton.
Third section—30 − (20 × 1.4) = 2 lb. per ton.
Fourth section—30 lb. per ton.

Total ft.-lb. at the wheels:

First Section—	
30 × 23 tons × 900 ft. =	621,000
Second section—	
58 × 23 tons × 1,200 ft. =	1,601,000
Third section—	
2 × 12 tons × 1,200 ft. =	29,000
Fourth section—	
30 × 12 tons × 900 ft. =	324,000
Total ft.-lb. at the wheels per cycle	2,575,000

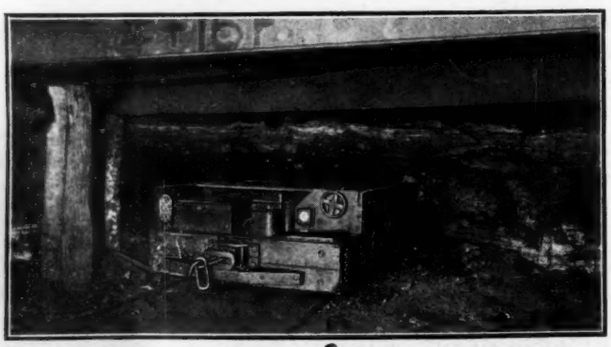
2,575,000 × 1.5 = 3,862,500 ft.-lb. battery output.
3,862,500 ÷ 2,652 = 1,458 watt-hours or cycles.
1,458 × 25 = 36,450, total watt-hour output of the battery per day of 25 round trips or cycles.

Assuming a battery voltage of 96 then the ampere-hour capacity of the battery will have to be 370.

If the ampere-hour capacity per couple (consisting of a positive and a negative plate) is 34, then the number of couples must be 11, or 23 plates per cell.

If the ampere-hour capacity per couple is 37, then the number of couples must be 10, or 21 plates per cell.

This simplified method of the battery calculation may be readily used to determine the practicability of a storage battery locomotive for any given amount of work and should eliminate the uncertainty that often exists in the mind of the manager because the calculations may be easily understood and verified.



LOW TYPE LOCOMOTIVE BECOMING MORE NECESSARY

The mining of thin veins is increasing daily. More efficient and safer methods of mining are attained wherever the storage-battery locomotive is properly applied.

Further Light on the Use of Carbon Dioxide in Fighting Mine Fires

Difficult to Check Fire When Rock Is Hot—Clay for Surface Cracks—Cement and Paint for Stoppings

IN THE discussion of the paper by Charles L. Jones, of the Mellon Institute of Industrial Research, Pittsburgh, Pa., delivered at the West Virginia Coal Mining Institute at Clarksburg, W. Va., June 12, and printed in *Coal Age* of July 5, the author said that carbon dioxide might not always be effective in the fighting of mine fires, especially where the fire has burned for years in a mine having thick cover.

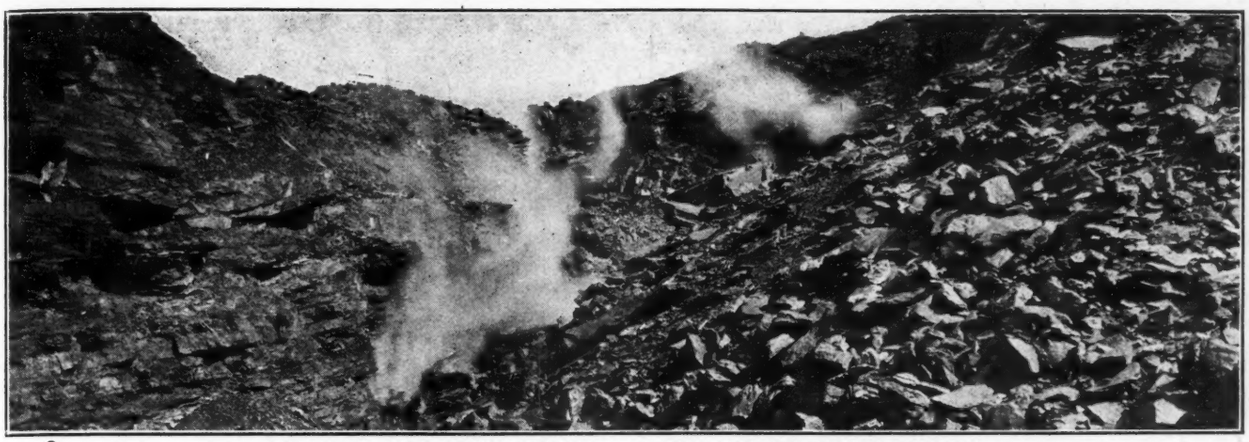
Heat is conducted from mine fires through the adjoining strata, and it is to this conductivity, however slow in action it may be, that the dissipation of heat in the early stages of a mine fire is due. Where, however, a fire has burned for years a heat gradient is developed in the rocks above and below the coal seam, and the high temperature of the rocks for a considerable distance from the fire will limit the rate of heat transfer, for the rocks will be insulators rather than conductors.

Consequently in such a case the cooling effect of the agents used to fight the fire will have to be relied on to lower the temperature in the fire zone. As none of the agents from a fire of this character can pass outward we can have little hope of extinguishing the fire with carbon monoxide or any other agent yet known wherever these severe conditions must be confronted.

Assuming that no further heat is generated by the fire after sealing, the rate at which the rocks will cool will be exceedingly slow. As proof of this statement Mr. Jones cited the conditions which prevail in the pumping of deep deposits of sulphur by means of the injection of steam. In some instances prolonged working of these deposits by this method has so extensively established the heat gradient that upon cessation of operation years would be required to cool the rocks to their original temperature.

On the other hand, where the overburden is comparatively light and yet solid, a fire may be extinguished even though it has burned for years, providing, of course, it can be sealed off properly. The overburden was light above the Bitner mine of the H. C. Frick Coke Co., of Pennsylvania. No doubt this factor was instrumental in shortening the time in which the carbon dioxide extinguished the fire. Though these conditions thus proved favorable to carbon-dioxide extinguishment they were not propitious for the fighting of the fire with water, little progress being made till carbon dioxide was introduced.

On being asked by W. E. Fohl how surface breaks were sealed, Mr. Jones replied that the plastic clay



MINE FIRE AT RED ASH COAL CO. MINE NEAR WILKES-BARRE

A fire in a shallow seam, that indeed outcrops in places and has partly been stripped, is now burning over a large area and extending its ravages rapidly. It has been burning so long that the roof rocks are in places white hot and metamorphosed as a result. Bad crevices have opened in every direction, letting in air. Unfortunately the ground is so hot that in places the surface cracks could not successfully be mudded tight. The fire has all the conditions that make extinction difficult.

forming the surface soil was tamped into the cracks that appeared on the surface. These were not systematically and thoroughly closed until after introduction of gas had been commenced, and it was stated that attention to this point might have prevented the loss of some of the carbon dioxide which was fed to the fire. The labor required is small when it is compared with that required in the direct method of fighting the fire. Forty men working five days completely closed off surface breaks by the tamping process.

Mr. Fohl said that he knew of a case in Ohio where gas lines were endangered by a fire in outcrop coal. This fire was successfully smothered by sealing the crevices with tamped clay.

Like Ships, Mines May Keep Gas on Hand

Reference being made in the reading of the paper to the fact that the steel cylinders for holding carbon dioxide cost approximately six times the value of their contents, Mr. Fohl asked, What is the life of the cylinders? Mr. Jones replied that the life is limited only by the corrosion that occurs on the exterior of these containers.

The demand for carbon dioxide for soft drinks is 90 per cent of the total production, and as this demand is seasonal, much of the manufacturer's capital is tied up in these cylinders and they return to the factory only slowly. The Interstate Commerce Commission requires that these containers be tested periodically. Ships which keep liquefied carbon dioxide in readiness to fight fires in their holds buy the cylinders outright. It may be possible in the future that isolated mines in seams susceptible to frequent outbreaks of fire will be provided with liquefied carbon dioxide in cylinders, the coal companies buying these containers outright.

In answer to a query by Mr. Fohl as to the cost of fighting the fire with carbon dioxide, Mr. Jones stated that 230,000 lb. of inert gas was used at the Bitner mine at an expenditure of about $15,000, that being the cost of the gas alone. This is approximately one-tenth of the whole cost of fighting the fire, for much money was expended in the direct method prior to the use of carbon dioxide.

With the knowledge now on hand, derived from experiences in fighting the fire in the Bitner mine, that expenditure undoubtedly could be cut considerably. This cost is remarkably low in view of the fact that the void in the fire zone had a volume of about 2,000,000 cu.ft.; that 200 men previously were employed to fight the fire by the direct method; and that about 2,000,000 gallons of water was pumped into the fire zone each day. Once the fire is sealed off, few men are required to administer carbon dioxide to the atmosphere in the fire zone.

At the Bitner mine the carbon dioxide was fed through four boreholes. J. B. Hanford asked if the gas could be fed directly through stoppings. To this Mr. Jones replied that it was inconvenient to transport the cylinders underground. One plan suggested was to feed the gas through a water line which already was in place; but because ideally located boreholes were already drilled it was decided to administer the carbon dioxide through them.

Someone in the audience suggested that this scheme would not be practicable where the overburden was thick, but Mr. Jones pointed out that it was entirely practical to introduce the gas through any sort of pipe whether used for air or water, thus relieving the situation.

Frank Haas wondered what becomes of the heat generated by the fire. If the temperature is high enough, even though there is no fire, when the fire zone is opened up (even though after a rest period of ten months or more), the inrush of air is sufficient to cause the heated coal to burst again into flame.

In answering his question Mr. Jones asserted that few men realize the value of the conductivity of adjoining strata as a means of dissipating heat in the early stages of a mine fire. The continuance of heat under conditions described by Frank Haas, for periods of ten months or more, he said, was due to just enough air leaking in to support the fire, which in reality was never entirely extinguished. Instead of breathing air the fire should be made to breathe carbon dioxide during the rest period before the stoppings are torn out.

Due weight should be given to the ability of water to lower temperature, Mr. Haas remarked, adding that he believed this property of water of more value than the conductivity of adjoining strata. Mr. Jones admitted that water lowered the temperature more quickly than the adjacent measures, but he believed that as the cooling action of carbon dioxide is inconsiderable and as water found its way to only 25 per cent of the area

ANOTHER VIEW AT THE GREAT RED ASH FIRE

In this mine fire the heat gradient is broken by the fact that the knife blades of coal in the superincumbent rock are burning. The rock shown is in places white hot, though unfortunately the illustration cannot bear witness to that fact. The rock becomes, like shale tile, strongly resistant to the passage of heat.

of the fire in the Bitner mine it was not reasonable to discount the heat conductivity of adjacent strata as a means of lowering the temperature of the fire zone, for its effect must have been appreciable.

During the discussion Mr. Jones made mention of the fact that a solid brick wall is not impermeable to air. Prof. A. C. Callen wanted to know what quantity of air would travel through such a wall in a given time when only a slight difference in pressure existed inside and out. Mr. Jones said tests have been made which show that a small chamber closed by solid brick walls which are plastered on the inside may change atmospheres in three hours. He suggests that if a coating of tar paint were applied to the brick stopping it might lower the volume of the air thus transpired. Incidentally, the Consolidation Coal Co. uses gunite for this purpose.

It is interesting to learn that liquefied carbon dioxide is now being used by the National Mining Co. to fight a fire in a refuse pile at one of its mines. Smoke from this fire is a nuisance to the nearby mining town, and the slate pile is fairly close to crop coal. Consequently an experiment is being conducted to attempt to put out the fire by the use of carbon dioxide. The same theory is recognized in this case as is honored underground, namely, that the heat conducted away from the pile must equal the heat generated if the fire is to be put out. Therefore carbon dioxide may be administered to the seat of the flame in quantities sufficient to disturb the heat balance. Results achieved thus far point to abatement of smoke and lowering of temperature.

In conclusion it may be said that there are wonderful possibilities in the use of carbon dioxide in the combatting of fires in stored coal. Apparently the ground has only been scratched in making the first successful application at the Bitner mine. If carbon dioxide is successful in fighting a fire in a mine-refuse pile, it will be equally as effective in fighting fires in our stockpiles of soft coal. We may later learn that it can be used periodically, and at no great expense, to check temporarily the oxidation of coal for periods sufficiently long to establish outside temperatures in the middle of a stockpile. This, if not too expensive, would solve one of our greatest coal problems, namely, industrial coal storage.

Why Not Scrap the Davy "Safety" Lamp?*

By J. W. Paul and A. B. Hooker†

THERE was a time when any suggestion that the Davy flame (safety) lamp be discarded would have evoked unlimited criticism. That time, however, is past. Investigations both here and abroad have shown conclusively that the Davy lamp does not have the necessary factor of safety against ignitions of mine gas, and Great Britain, the last stronghold of the Davy lamp in Europe, has eliminated this lamp and substituted safer types. In the United States there are companies which still use the Davy lamp in spite of all that has been said and published as to the dangers connected with its use.

Recently the purchasing agent of an anthracite company requested the Bureau of Mines to pass upon the safety of some brass gauzes for use in a shielded Davy lamp. This is an ordinary Davy safety lamp equipped with a circular brass shield that is attached to the lamp posts. This shield extends about one-half way around the gauze and one-half of the gauze height. The main purpose of the shield is to prevent the extinguishment of the lamp by a sudden increase in the velocity of the air.

Bureau Tried Both Brass and Steel Gauzes

The brass gauzes submitted for this test represented two grades of brass—one yellow and one red. The analyses of these brasses were not determined. Two shielded Davy lamps that were submitted for the tests each had a steel gauze. These steel gauzes also were tested. Tests were made in horizontally moving mixtures of Pittsburgh natural gas and air at velocities of 400 to 1,000 ft. per minute. The gas percentages used were 7, 8.6 and 11. Tests were made with the lamp shield in two positions relative to the lamp and to the direction of flow of the gas-and-air mixture. In one position the shield was between the gauze and the flow, as normally used. In the other position the shield was on the downstream side of the lamp. The tests were continued until one or more failures or gas explosions had been obtained with each of the six gauzes. The results of these tests may be summarized as in Table I.

TABLE I—PERFORMANCE OF DAVY LAMPS IN GAS AND AIR

Total number of tests	24
Number of tests in which ignition occurred	14
Number of tests in which rupture, or melting, of the gauze occurred	2
Lowest velocity (feet per minute) of air mixture at which ignition occurred	800
Highest velocity (feet per minute) of air mixture at which no ignition occurred	900

The Davy lamp failed in velocities of 800 to 1,000 ft. per minute. The highest velocity in which the lamp did not fail was 900 ft. per minute and under the following conditions: (1) Lamp equipped with a red brass gauze in not more than 7 per cent gas mixture; (2) Lamp equipped with an old, considerably oxidized red brass gauze in not more than 8.6 per cent gas mixture and the shield in its normal position between the lamp gauze and the air current. No ignition of the external mixture occurred in velocities below 800 ft. per minute.

The brass gauzes that failed by rupture failed at velocities of from 100 to 200 ft. per minute lower than the steel gauzes which failed without rupture. This,

*From Reports of Investigations, U. S. Bureau of Mines.

†Chief of coal-mine investigations and assistant electrical engineer, respectively, U. S. Bureau of Mines.

however, was not true with the red brass gauzes, which failed at practically the same velocities as the steel gauzes and without rupture. Gauzes became heated to redness in velocities as low as 400 ft. per minute. Though normally this might not be considered dangerous, conditions might easily arise that would greatly increase the danger, as for example—there might be some foreign substance such as oil on the gauze, or the lamp flame might strike the gauze so that the heat would be localized over a small area; also there might be contact with clothing or dry brattice cloth, which would ignite external gas.

Some tests conducted in Great Britain and confirmed by early tests of the Bureau of Mines, have shown that a sudden concussion wave in the air produced by blasting coal or rock will often cause the flame of the burning gas within the Davy lamp to pass through the gauze and ignite external gas, and this danger is accentuated when the gauze is heated.

The location of the heated gauze area through which ignition occurred seemed to depend upon the position of the shield, the action of the wick flame, the quantity of oil (fuel) that was distilling from the burner and the distribution of the flow of gas through the gauze. If the shield was between the gauze and the current, the gauze usually was quite evenly heated on the downstream side, yet sometimes, due to the playing of the wick flame against the gauze and to burning oil around the burner, the gauze would become heated over a small area at the lower downstream side of the gauze. If the shield was on the downstream side, the failure occurred on the downstream side of the gauze at a point just above the shield and below the gauze cap.

A comparison of the behavior of the shielded Davy lamp with that of an unshielded lamp tested during a previous investigation showed that the shield offers some protection to the gauze. However, the test results as a whole show that any type of Davy lamp is an unsafe lamp for use wherever gas is likely to be encountered. The Bureau of Mines does not approve a flame safety lamp as permissible for use in gaseous mines unless it is equipped with double gauzes, a bonnet and a magnetic lock and has been proved by tests to be safe in velocities up to 2,500 ft. per minute. Great Britain, the country in which the Davy lamp was first used, recognized the danger connected with its use and has substituted safer types. The report of the British Department of Mines for 1918 shows that of 590,185 flame safety lamps then in use in the United Kingdom, only four were Davy lamps. The Department of the Interior learns from reliable sources that there are still about 8,000 Davy lamps in use in the anthracite mines of Pennsylvania. It is believed that every Davy lamp in use represents a possible hazard to life and property and that all of these lamps should be scrapped in favor of safer types.

Motive Power Makes Traveling Car Dump Operate Successfully

NO NEW IDEA is the traveling car-dump carriage. It has been found for many years on rock dumps. As usually made, it looks highly serviceable, yet it performs abominably. Either three or four men operate it with some celerity or two men strain at it almost in vain and get less done than with an ordinary gallows dump. The difficulty is to push the heavy carriage and car over a track that cannot be kept up to grade or in alignment because the dump on which the track rests always is moving. Another problem is to keep the track *on* the deck and that *at* the deck at such a steady vertical interval that it will be easy to load cars on the carriage and take them off, and even when they are right in this relation it may be difficult to push the carriage round to just such an angle as will permit of docking.

Though few seem as yet to have realized it, almost all this clever device needed was *power* to fill all its various functions, each of which it was well designed to perform. It needed power for embarking, transporting, and disembarking, and given this its operation would be easy. Especially did it need power for transporting for as soon as it is provided with locomotive power, it is easy and permissible to make it heavy enough and thus have the dump so mechanically constructed that its revolving will be easy. When locomotive powers are afforded to the carriage, moreover, it is a matter of small concern if the dock is placed sufficiently far back that it will rest on a piece of dump that has settled or even on solid ground so that the embarking and disembarking will be certain and accomplished without strain. As for the dumping, that is readily performed if gravity is allowed to help. Returning the car to the horizontal, however, in that case is more difficult, but the energy of transportation can be made to do this, as will be seen later.

The Bloomsburg Locomotive Works, of Bloomsburg, Pa., provides a car-dump carriage with a motor equal to propelling the sturdy vehicle and car along an uneven track at five miles per hour over a grade of 4 or 5 per cent against the load. A sag from a level grade of only about 3 or 4 in. in 6½ ft. makes a grade of that size, but that depth of sag is not likely to be exceeded in a 6½ ft. distance. The wheelbase of the carriage is 6 ft. 5¼ in., giving the car reach enough so that it does not make too much of little sags in the road. The carriage has good journal bearings with an oil cellar and eight coil springs —two for each journal. The gage, of course, varies according to need and may be 36 in. or less.

In the straight-ahead dumping car, of course, no revolving mechanism is provided. When the controller is thrown the carriage goes forward under its own power,

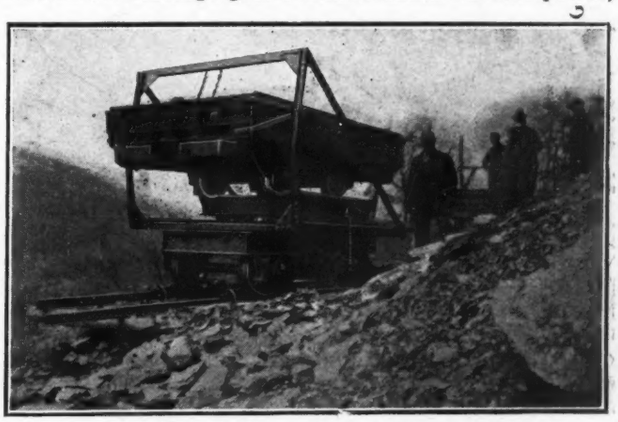


FIG. 1—STRAIGHT-AWAY CARRIAGE DUMP IN OPERATION

Proceeding under its own power this carriage-dumping platform takes the car from the wharf or pier to the end of the rock dump, where it is allowed to tip up and discharge its load, the gallows frame lifting the endgate. The ability to move itself over adverse grades of 4 per cent makes practicable what is a somewhat difficult method of dumping when attempted by the brawn of a gang of day laborers, unaided by electric power.

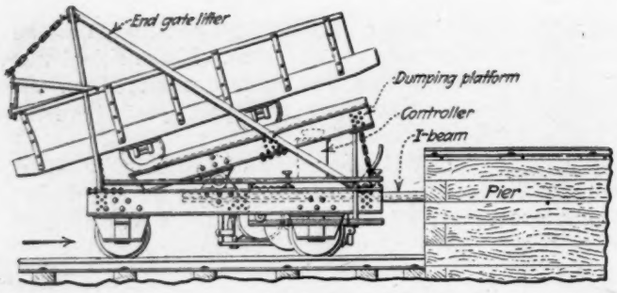


FIG. 2—ROCK DISCHARGES, DUMP RETURNS TO PIER

When the platform tips it causes an I-beam in the rear of the car to project. The platform remains tilted until it reaches the wharf which drives in the I-beam, brings the platform back to the horizontal and in doing so kicks back the car, which runs on to the pier as a result.

up or down hill, to the end of the dump. Here the platform is released. It tips up and in doing so thrusts back an I-beam, which it thus causes to project 3 ft. behind the carriage. When as a result of the tip the car is discharged the platform does not drop back into place but remains tilted until the carriage has under its own power been returned to the dock. In going to the pier the I-beam strikes first, rights the platform, allowing the car to kick back and so pass from the carriage to the dock.

As the gradient on this dock inclines toward the carriage it is easy to load the car onto the locomotive truck by gravity. It has been noted that it is unloaded by the same simple means. One of these straight-ahead car-dump carriages can be seen in daily service at the mines of the Wyoming Anthracite Co., Shickshinny, Pa. It is asserted that one man can handle the carriage, though its weight is 6,850 lb., and it will carry 18,000 lb. A revolving car-dump carriage also is made whereby rock can be dumped in all directions with equal facility. By changes in the old car-dump carriage, which bring it into line with our modern power-driven machinery, and by some adjustments well adapted to its new characteristics, it has been so greatly improved that instead of two to four men being needed to operate it, one is enough and he does the work rapidly and without strain.

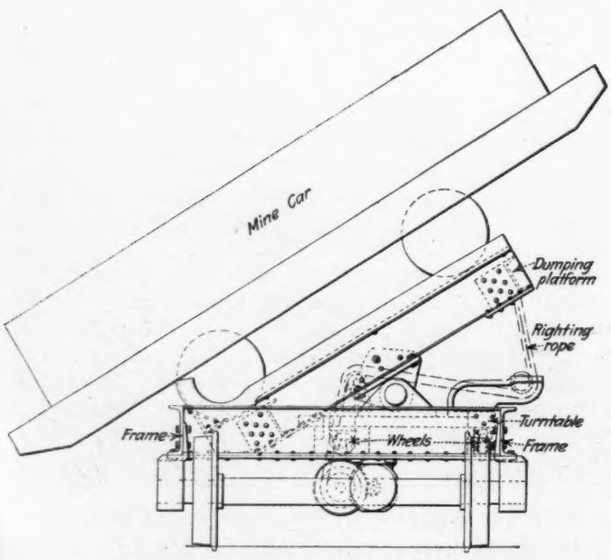


FIG. 3—REVOLVING DUMPING CARRIAGE

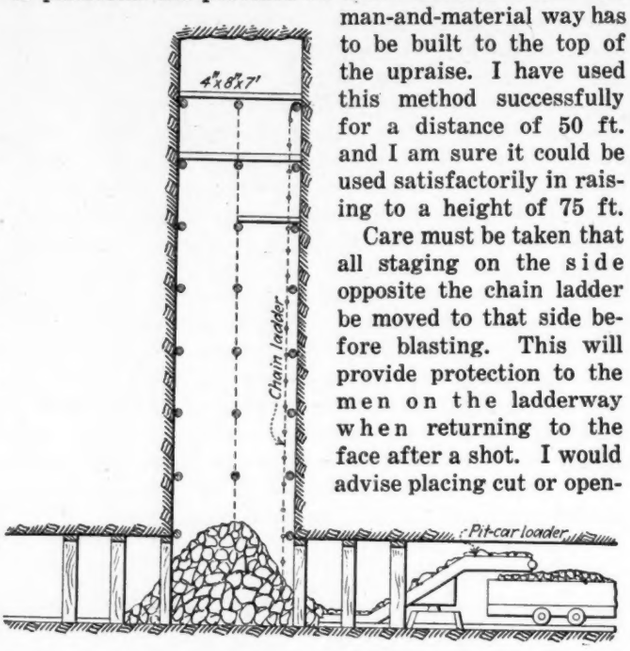
Here the platform has been revolved a full right angle. The whole top of the carriage does not revolve, only the front part. The propulsive machinery remains in the normal position on the truck prior to, during and after dumping.

Lightening Labor of Upraising Shaft

By J. W. Powell
Shaft Contractor, Charleston, W. Va.

IF A SHAFT is excavated as shown in the illustration not only is time and material saved but some of the danger of this class of work also. All the material is loaded out as the shaft is driven upward and staging or platforms are provided on which the men work. No man-and-material way has to be built to the top of the upraise. I have used this method successfully for a distance of 50 ft. and I am sure it could be used satisfactorily in raising to a height of 75 ft.

Care must be taken that all staging on the side opposite the chain ladder be moved to that side before blasting. This will provide protection to the men on the ladderway when returning to the face after a shot. I would advise placing cut or open-



ROCK REMOVED AS FAST AS BLASTED FROM UPRAISE

Care is taken to shoot rock so that it has a free fall on a side of the shaft remote from the chain ladder. The working platform is moved to the right side when blasting.

ing-up shots on the left rib and that care be taken to see that this cut is out clean before blasting the rest of the round. By using this method of drilling and blasting all material on the right rib is blown toward the left rib. This reduces the chance of blowing out the timbers below, which is likely to happen where the wedge cut is blown in the center of the raise, for the whole force of such a shot is exerted downward.

THE UNITED STATES is one of the largest coal-land owners in the world, according to information collated by the Department of the Interior. The government also owns immense tracts of oil shale besides important deposits of phosphate, potash and other salts. At the present time the Interior Department supervises between 30,000,000 and 40,000,000 acres of public coal lands through fifteen states and while mining on private coal lands overshadows mining on public lands there is every probability that in the future the situation will be reversed. Coal is now being produced from government lands in eight states and there are more than one hundred mines. In addition the government has one phosphate lease, one oil-shale lease and four potash leases on public lands.

ADDED FUNCTIONS SHOULD BE MULTIPLIED.—In a letter, W. A. Neff, of M. A. Hanna & Co., calls attention to the printer's error on page 1005 of the issue of *Coal Age* of June 21. The formula should be

$$G = \frac{(W_L \times R_L) - (W_E \times R_E)}{20(W_E + W_L + 2M)}$$

Old-Time Ohio River Coal Traffic Is Revived

Fuel Fleets from Kentucky and West Virginia Fields Grow as All Freighting Increases After Worst River Year in History—9-Ft. Stage Near—Machinery Replaces Shufflin' Coal Passer

By A. W. Williams
Louisville, Ky.

ONCE more the black smoke of coal traffic is beginning to float over the valley of the Ohio. River coal shipping of the "good old days" from Pittsburgh to New Orleans may in great measure revive. While the tremendous volumes of Pittsburgh coal that once moved by inland waterways may not be equalled in 1923, yet there is a distinct movement of West Virginia, eastern Kentucky and western Kentucky coal toward the Ohio and its tributaries. Big coal consumers are becoming more numerous along the rivers, boat building is reviving, coal producers are acquiring considerable fleets, and great tows of coal such as have not been seen since 1914 are beginning to move.

The whole freight traffic of the Ohio is swelling as a result of the improvements the government has made in the river in recent years. Today enthusiasts for Ohio River traffic are morally certain that the government is going to provide by Jan. 1, 1925, the long-heralded "9-ft. stage" which, by means of locks and dams yet to be built around the falls and shallows near Louisville, Ky., will guarantee sufficient depth for year-round heavy shipping. Recent dispatches from Washington indicate that a considerable portion of the 1923 congressional appropriation of $56,000,000 for rivers and harbors will be used on the Ohio. If $15,000,000 is devoted to the "9-ft. stage," they say, coal, oil and steel movement by water will be unthrottled at last. The immediate development of the "9-ft. stage" will be on the Ohio down to Louisville, thus making that city a great transfer point. The stage is to be extended southwest to the Mississippi later.

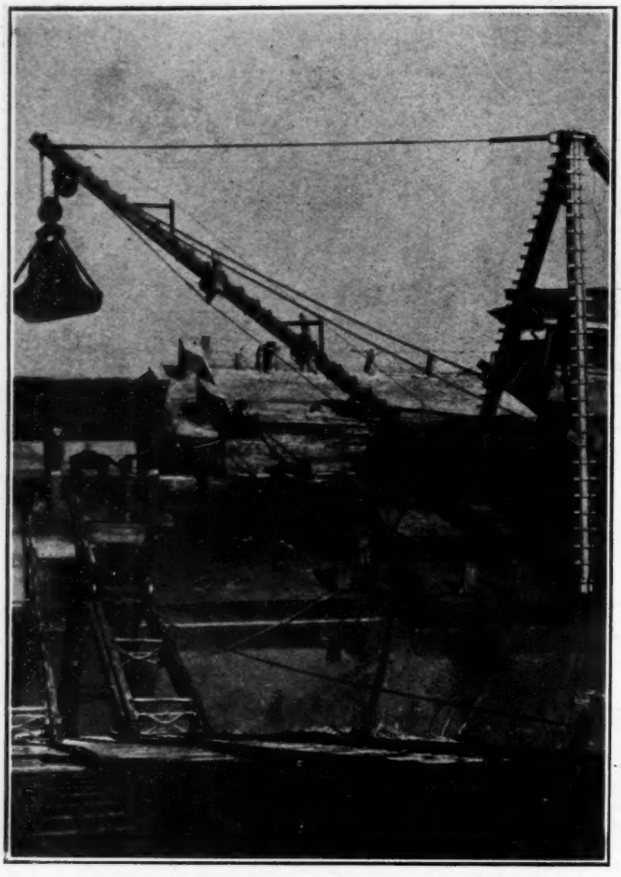
NOTE—The headpiece depicts a coal-handling plant on the Kentucky River. The digger boat in the center background is unloading a coal barge into cable cars on an incline track running up the bank to a coal elevator behind the trees. Kentucky River equipment on the average is smaller than that on the Ohio.

Washington on March 27 announced plans for the creation of government barge lines operating on the Ohio, Monongahela and Mississippi rivers. Secretary Weeks said that the ultimate aim was for an inland service connecting at New Orleans with coastwise service. Incidentally the government has recently taken up its river equipment which had been operated by the Edward F. Goltra interests, of St. Louis.

Until the past year or two rotting steamboats and barges were to be had for a song on the Ohio River, but today the old equipment has been pulled from the mud flats and is being reconditioned as rapidly as possible. Shipyards are all rushed, and turning out principally steel boats and barges. Some houses would like to purchase steel barges, but can't get deliveries, and are taking the less desired wooden boats once so familiar in the coal trade but which have fought a losing battle with bigger steel barges.

In all this activity coal shippers are taking a keen interest. While it is easy for them to hark back in memory not so many years when the coal traffic was in its heyday, it is easier still to look at the statistics of recent years and realize that coal traffic through Louisville, for instance, has amounted to little and has been getting less and less. Since the war, coal movement through Louisville dropped from 89,000 tons in 1918 to 39,534 tons in 1922, according to that city's Board of Trade figures, with a steadily descending curve through those years relieved only by a 65,000-ton "peak" in 1920.

The season just past was the worst that the inland transportation companies on the Ohio River have ever experienced, as the river was lower than at any other time in twenty years. For months only the smallest of gasoline packets were able to operate, and these spent much of their time on sand bars. In the upper Ohio



COAL INCLINE FROM RIVER TO ELEVATOR

The crane on the floating "digger" lifts coal from barge to hopper from which it drops into 1-ton steel cable cars which transport it up the incline to a dump in the elevator.

River, coal from the Kanawha River section of West Virginia was brought to Cincinnati for transfer to rail and for local demand. Considerable tonnage was moved by manipulation of locks and dams, but ten tows were aground at one time when the river ran out from under them. The Kanawha fleet had plenty of trouble in reaching Cincinnati, while from Cincinnati to Louisville it was impossible to move much tonnage.

It is difficult to get accurate figures on the shipping of the "good old days," but the movement through the "port of Louisville" was many times larger than that of any other recent year. Captain M. J. Sebolt, for twenty years with the old Monongahela River Consolidated Coal & Coke Co., which operated a number of towboats and hundreds of barges, with digger boats for unloading and pump boats for rescue work at many points, says he put 1,400 coal boats of 1,000 tons each and 600 barges through the canal or over the falls at Louisville in a single year. All of this went south, some of it reaching New Orleans.

That company's equipment all bore "R. C." in great letters. The "R. C." stood for "river coal," but as the Monongahela was in practically complete control of the river movement of coal, the company became known as the "Combine" and the letters stood, in most minds, for "River Combine."

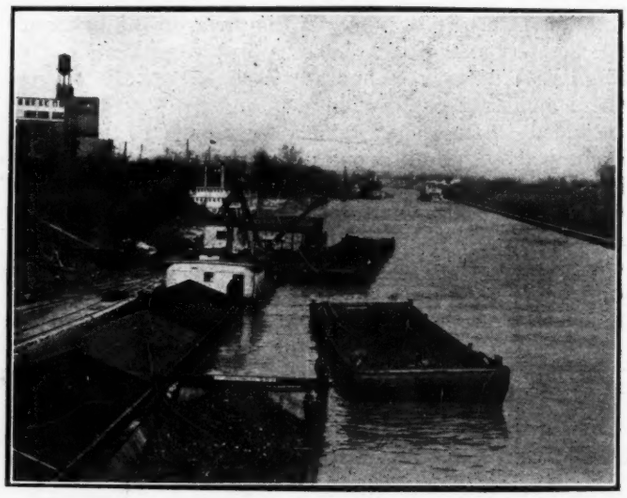
A few years ago the old "Combine" took some great tows south. Louisville was a vital point, due to the Falls of the Ohio and three bridges, one of which spanned the rapids, leaving a relatively narrow passageway for handling big tows. At high water there is not much fall to the river, and tows were taken over the falls, while at lower water they were broken above Louisville and locked through the canal, to be made up again below. Generally all large tows were broken and taken over the falls in smaller units.

Frequently in handling a large tow over the falls a powerful small tug would be lashed across the head barges, to aid the big pusher or towboat get through the bridges. Some of the largest towboats seldom came above the locks or falls. Smaller boats brought fifteen- or thirty-piece tows to Louisville, loading fifty pieces on the Sprague, below that city. The Sprague was by far the largest and finest towboat on inland rivers. At Cairo, Ill., where the Ohio joins the Mississippi, the Sprague would pick up fifteen to twenty additional pieces, and go south with 65,000 to 70,000 tons of coal besides a couple of fuel boats containing her own needs.

There were numerous other big boats which carried thirty or forty pieces. The Raymond Horner, the W. W. O'Neil, the Duquesne, the Oakland, Iron Age, Alice Brown, Harry Brown, Sam Brown, John A. Wood, J. B. Finley, Joe B. Williams, F. M. Wallace and the Gleaner were among the big boats which brought coal to Louisville and carried it south. The Williams, Finley, Sprague and Wallace were among the big fellows that were loaded up below Louisville for the heavy trips. Many of these boats were burned or dismantled years ago. Some are still in operation. The Sprague is towing ore on the Red River of the South.

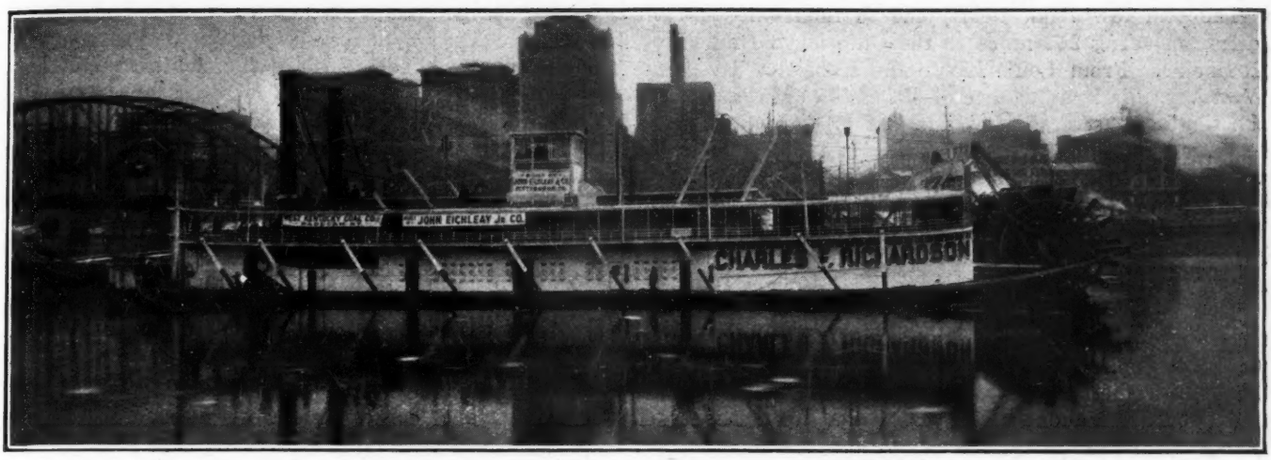
What has become of the great river traffic in coal? is sometimes asked by the man who has no knowledge of the subject. First of all, the railroads made competition keen, but could not hurt the companies that were hauling their own coal. Rail competition did cut down profits, however. Then the war came along and demand for fuel in the Pittsburgh district became so heavy that Pittsburgh coal was all needed at home, and there wasn't much available for movement elsewhere. The "Combine" began selling its boats and equipment, dropping out of the "coal by river" business.

Handling coal by river could be done profitably when everything went well. There have been spells, however, when luck was against the coal transportation business. Low water in summer and ice in winter are bad. Then there are the falls at Louisville, bridges at various points, and in the lower Mississippi tropical storms during which the wind reaches a high velocity sweeping the flat country. In high water a boat occa-



PARALLEL INCLINE UNLOADING PLANT

Standard railroad cars can be run alongside the barges so that the "digger" transfers coal by clamshell, direct from boat to trains thus eliminating one or more handlings in the transfer of fuel from river to rail.



THE C. F. RICHARDSON, PRIDE OF THE LOWER OHIO RIVER

This $350,000 towboat, built a year ago for the West Kentucky Coal Co., is designed to handle immense tows of thirty or more 1,000-ton coal barges, or enough coal to fill at least ten trains of sixty cars each. Tremendous power boats like this put river coal traffic on a scale so big that great economy is secured.

sionally has gone aground while trying to keep out of the heavy current. Sometimes, in high water, they stuck in the mud of nearby fields and stayed there high and dry until the next flood floated them or they fell apart.

The big operators of the early days figured that the only way to make money in moving coal was to handle enormous units. In the upper river great units were troublesome because of the narrower river and lower bridges. After they brought coal several hundred miles to Louisville, however, the big boats were given as many pieces as they could carry for the long trip south.

A coal barge is well constructed and can stand a good deal, but it cannot stand being jammed against a bridge pier or into the bank. A wooden coal boat was a flimsy sort of creation, short-lived at best, and easily wrecked. In the old-fashioned boats it was necessary to keep steam syphons going day and night to prevent sinkage. The sinkage of one barge or coal boat sometimes meant that before lines could be cut a number of other pieces would be pulled under.

It is reported that the famous old Sprague on one occasion lost her entire tow of some fifty pieces. Due to the size of her tows the Sprague used a steel line and a very intricate system of putting her tow together. If a barge sank it was impossible to cut loose the steel lines, but if a hemp rope had been used on such huge tows the strain of flanking a tow around the bends might easily have broken the rope. The Sprague was an unfortunate boat and her operation costs were high. Her losses through wrecked boats and barges and coal sunk in the river ran into enormous sums. In the lower Mississippi with a good stage of water she was ideal, but in flood stages or when a tropical storm broke she needed a lot of luck.

Bad luck in handling big tows along with the fact that the "Combine" lost its desire to sell coal to the Southern markets resulted in river movements slowing up. Then came the great winter of 1917-1918, when heavy ice broke loose throughout the valley of the Ohio. The great jams wrecked boats, barges, towboats, pump boats and packets until there was little equipment left on the river. The finest of the river boats were wrecked. Ice at Cincinnati crushed the City of Louisville and the City of Cincinnati, to two fine "white collar line" mail, passenger and freight packets of the Louisville & Cincinnati Packet Co. Equipment was swept out of the mouths of various smaller streams, where it had been placed in winter harbor for safety. The entire Ohio valley was strewn with wreckage of river equipment. Hundreds of pieces of equipment were destroyed.

That checked river operations for the time being, but capital once more sees the opportunity in river transportation. River workers are not organized or unionized, and freight rates can always be held at well under the rail rates of transportation, which promises to stay high for years as a result of the rail-labor situation. This means that river transportation cannot be throttled easily by rate cutting on the part of the rail carriers, while at the same time the river carriers help to prevent advances in rail rates.

With river shipping coming back it is natural to see big organizations developing river-freight and coal-handling facilities. One of these is the Inland Waterways Co., a two million dollar corporation of Louisville, Ky. Included in its directorate are found James P. Barnes, of the Louisville Railway Co. and Louisville & Interurban R.R. and also Harry Reid, of the Interstate Public Service Co., the great Insull organization, operating interurban lines from Louisville north to Indianapolis and over a wide stretch of country.

The Louisville-Interurban lines can distribute coal in cars to many suburban towns and plants as well as to plants in Louisville. Between the steam and electric lines the company figures to be able to distribute river coal after it reaches Louisville to all industries there, and will also operate a big retail elevator, and perhaps two, to handle less than carload deliveries.

The company also owns 2,000 acres of coal on the Kentucky River at Beattyville, Ky., far across the state in the southeastern coal fields. It has developed one mine, with one drift opening from which coal is moved on an incline to a river tipple. This mine has a maximum capacity of 450 tons a day and averages 300 tons, but it is to be enlarged as soon as the market warrants.

River men constantly point to the cheapness of river shipping over railroad transportation. Patrick Calhoun, Sr., president of the Inland company, stated that his concern has handled 53,000 tons of general cargo from Beattyville on the Kentucky River to Louisville within the past few months, at an actual cost to the company of 94c. a ton, as compared with a freight rate of $1.76 a ton average on the same hauls by rail. The 94c. does not include interest and depreciation, however.

The coal tow from Beattyville to Louisville is 320 miles, including 260 miles to the Ohio and 60 miles to Louisville. From Louisville to the Kanawha River in West Virginia is a distance of 337 miles. Movement in the Kentucky River is slow due to the large number of locks, while Ohio River movement is faster due to a wider stream and larger locks. Neither of these hauls is much shorter than the former haul to Louisville from Pittsburgh of 604 miles. The total haul from Pittsburgh actually was 634 miles, for the tows were picked up about thirty miles above Pittsburgh.

This means that coal can be brought into Louisville from either the Kentucky River or the West Virginia (Kanawha) district at much less cost than from the Pittsburgh district. The Kentucky mines are young and productive and the West Virginia district is tremendous. In each case there is no large local consuming market to interfere with big-scale shipping down the river.

Another company which is making history in river transportation is the West Kentucky Coal Co., Paducah and Sturgis, Ky., of which Charles F. Richardson is the active head. This company during the last few years has been handling a great deal of its coal by river and is steadily enlarging its river movement. Today it is handling from 300,000 to 400,000 tons of coal annually from its mines in western Kentucky, near the mouth of the Ohio River, to Memphis, St. Louis and other points.

The company can get a daily output of 7,500 tons from its string of mines. A good deal of this is borne to market by water. In the Sturgis territory four mines in Union County are five miles from the river loading tipple at Caseyville. Six mines in Webster County are 14 miles from the river. Three 100-ton locomotives and 150 drop-bottom coal cars are in service between the mines and the river tipple, which has a capacity of 100 tons an hour. The river haul from Caseyville down to Memphis, a great distributing point for river-and-rail coal, is 350 miles.

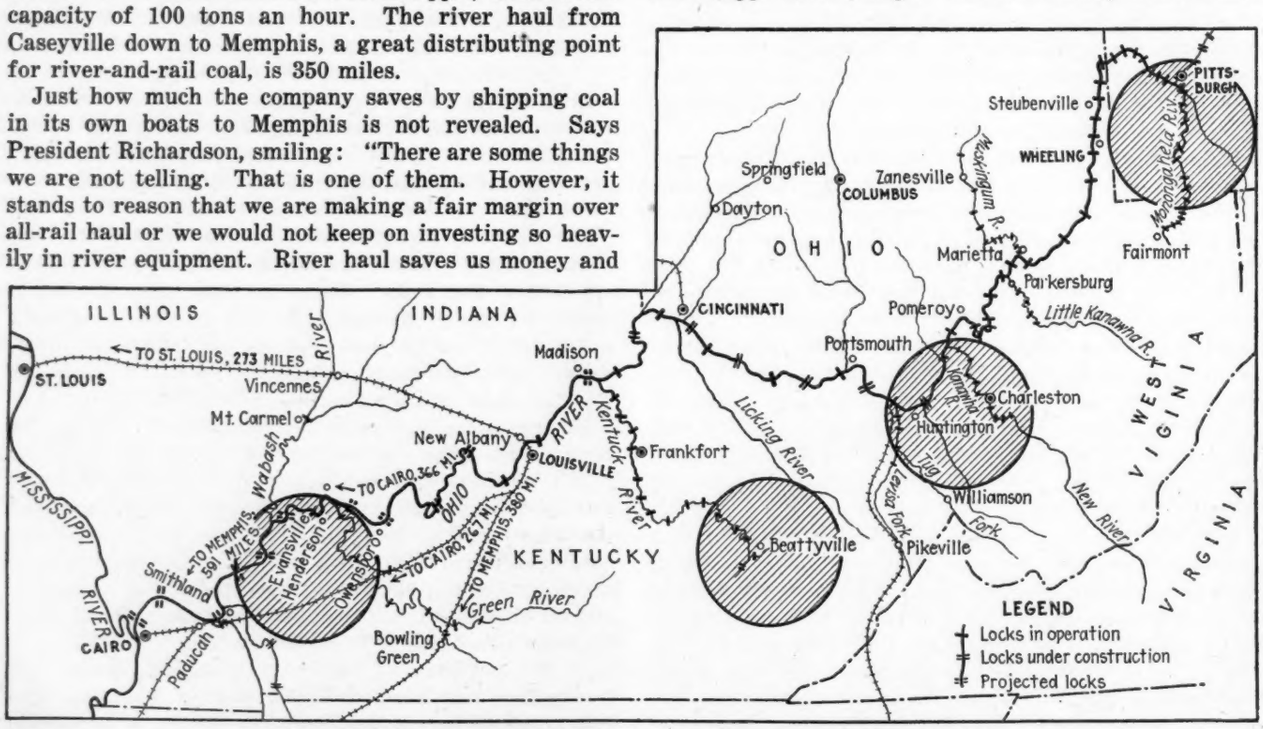
Just how much the company saves by shipping coal in its own boats to Memphis is not revealed. Says President Richardson, smiling: "There are some things we are not telling. That is one of them. However, it stands to reason that we are making a fair margin over all-rail haul or we would not keep on investing so heavily in river equipment. River haul saves us money and it sometimes gets us a market we could not otherwise reach."

The company handles coal as far South as Natchez, Miss., and plans later to go to New Orleans, as it increases its river market and its equipment for handling. The company formerly towed to Donaldsonville, La., but when the Texas Pacific R.R. decided to burn oil instead of coal in its locomotives the Donaldsonville haul was abandoned.

In its river equipment this company has 175 barges and is building twenty more, of which fifteen will be of wood and five of steel. It has twelve pump boats to keep barges free of water and four steam coal diggers at unloading and transfer terminals such as Memphis, Paducah and Rose Clare, Ill. The company has thirty flats and is adding three. It operates three large steam towboats, two steel hull steam tugs and one wooden-hull steam tug. The Gleaner, one of the company's big boats, is out of commission getting a new steel hull. The Reaper, another big boat of old-time fame, was sold after the purchase of the Charles F. Richardson, one of the largest and finest towboats on the river.

The Richardson is handling thirty-piece tows composed of 600-ton barges to Memphis, also carrying one fuel barge for her own use. She can carry 30,000 tons at a clip, but the company has been short of empties and hasn't been giving the big steamer a full load.

This company operates its own barge-building plant at Paducah and makes most of its own repairs to river equipment. The new steel barges which it is having built by the American Bridge Co. for autumn delivery will be 26 x 175 ft., 11 ft. deep, and will hold 1,000 tons each. The coal company is building the fifteen new wooden barges in its own plant. These will be 26 x 135 ft., 8½ ft. deep, known as the standard 600-ton Mississippi River barge. It also recently built a new



MAP OF THE OHIO RIVER AND ITS COAL SHIPPING TRIBUTARIES

The four circles roughly indicate the mining fields where most river coal originates. The lower three fields just now are displaying especially lively interest in the reviving river trade. From the western Kentucky field coal goes as far south as Memphis for transfer to rails but may once more penetrate further south. Coal from the field centering at Beattyville, Ky., is moved by river to Louisville for little more than half the rail rate in spite of the time needed in passing the many locks in that river.

hull for a steam digger at Memphis. The company is using 2-yd. clamshell buckets of the Williams make on its diggers.

Its big steam all-steel towboat, the C. F. Richardson, placed in service about a year ago and costing approximately $350,000, is a floating testimonial of what the West Kentucky company thinks of the future of river transportation.

The problem of loading coal into barges is simple for those mines near the headwaters whose tipples are directly on the river bank. Many properties that are back from the river distances up to half a mile use conveyors. In the case of one of the Frick mines near Connellsville, Pa., a conveyor five miles long is now under construction. But in the case of many mines in West Virginia and in the Kentucky fields, short rail hauls in company equipment connect mine tipples with river-loading tipples, where coal is chuted from drop-bottom cars through a pocket under the track directly to barges in the river below. At some loading points the loading is by crane.

Unloading at points of destination usually is accomplished with "digger boats" or steam cranes mounted on boats and operating 1½-yd. or 2-yd. clamshell buckets. Where great volumes of coal are handled regularly, usually the unloading is by clamshell into hoppers which load 1-ton cable cars on an incline running up to a coal-storage plant. Where the coal is being reloaded for rail haul and where the river bank is low, usually the unloading is direct from barge into railroad car by "digger." If the river bank is high, the standard-gage railroad track paralleling the river may be built on an incline of 1½ or 2 per cent running down into the water. Thus it can be used at any river stage. Some unfortunate experiences with tracks floating off such inclines during high water have led to the use of steel ties and track-anchoring schemes.

TRACK LAYOUT ON A ELEVATOR INCLINE

Some inclines are double tracked clear down to the water's edge, where a double loading hopper is used. In this case the hopper is single and the pair of balanced cars both load at the same point.

The cost of unloading by "digger" boats varies. Some small riverside coal companies that do not own their own "digger" boats get service from the water coal companies when they purchase river coal. The average charge for such unloading service is 50c. a ton because it is sometimes necessary to move the "digger" boat several miles to the unloading point. However, the Pittsburgh Fuel Co., Louisville, estimates that under normal conditions the cost is only 5c. or 6c. a ton for digging coal and handling it into the elevator or to yard piles.

In unloading the old wooden barges it was found that seven-eighths of the coal could be taken from a barge in about the same time as the final eighth, as cleaning up the barge bottom is slow hand work. The clamshell can't clean up barge bottoms on the old-style single-skin wooden barge. The new steel barges, however, have inside wooden "skins" with sloping sides which deliver the coal toward the center, making clamshell unloading more nearly complete. Also the new barges have fewer cross members to interfere with the bucket's operation.

THIS STRONG-BACK-AND-WEAK-MIND JOB IS PASSING

These huskies are coaling a river steamer from a barge, which is a method once used to unload barges at destinations in the days before mechanical unloading machinery came into general use.

Whereas once upon a time river coal was handled on and off of barges by long lines of singing, shuffling negroes with two-bushel baskets and two-man boxes, today steam and electricity do the job with a great deal more speed and a great deal less perspiration. Every year sees more economy and more mechanism. This is expected to be especially noticeable during the present summer and next autumn, as the river coal fleets grow in number and in unit capacity.

That work will progress more rapidly on the Ohio River to completion of the 9-ft. stage is shown in reports that $5,000,000 has been appropriated for Ohio River lock and dam work, and $375,000 for channel work, of the $56,000,000 appropriation of Congress for river and harbor work, which action was taken over the protest of the Budget Bureau. The money for Ohio River work has already been alloted by Secretary Weeks. Large sums also have been alloted for work on the Monongahela, Tennessee and Cumberland rivers, all tributaries of the Ohio.

Upper Ohio River districts report some shipments of coal and oil, while movement into Louisville from the Kentucky River and Kanawha River continues good. Some of the local retailers who have not handled river coal for the past several seasons will stock it this year.

A Coal Gas Mainly Consisting of Hydrogen

A NEW method of making coal gas has been investigated by C. B. Tully, an engineer of Newark-on-Trent, Nottinghamshire, according to report received by the Department of Commerce from Vice Consul Herbert C. Biar at Nottingham. After three years of experimentation he has succeeded in considerably reducing the quantity of carbon monoxide in household gas from the 12 per cent which it usually contains. The experimental work is said to have definitely passed the research stage.

The inventor claims that not only is this invention valuable from the standpoint of health and safety but also for other reasons, such as the possibility of making a gas containing from 87 to 90 per cent of hydrogen for use in the manufacture of synthetic ammonia or for filling the gas bags of balloons and dirigibles.

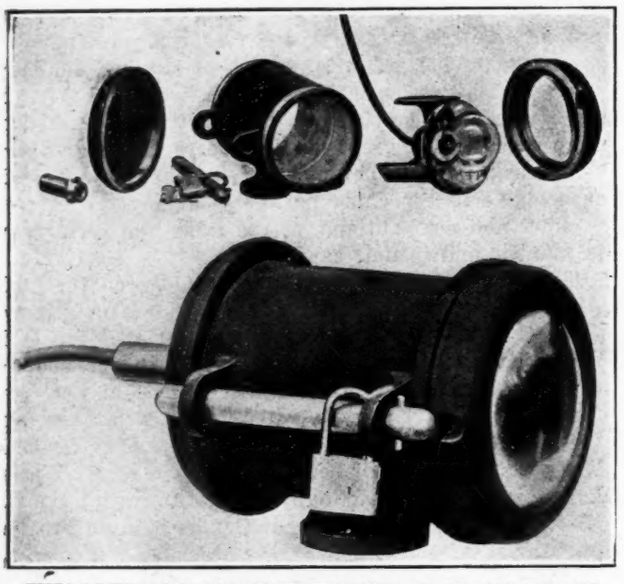
The importance of the invention is said to be definitely proved by its adoption by new plants in various parts of the United Kingdom, and the London representative of a Japanese firm is reported to have arranged for an installation at Kobe, Japan.

New Equipment

Permissible Headlight for Gaseous Mines

IN THE further development of permissible equipment the Mancha Storage Battery Locomotive Co. of St. Louis has recently placed upon the market a headlight suitable for use on storage-battery locomotives or any other type of machine, such as a coal cutter, used in gaseous mines.

The headlight is very simple in construction, being made of a few parts. It is nearly a round barrel threaded at each end to receive a cap after the insertion of the spider which carries the light socket, which



EXPLODED AND ASSEMBLED VIEW OF FLAME-PROOF PERMISSIBLE HEADLIGHT

Simplicity of construction, few parts and ruggedness are big features of this headlight. It is built to withstand the hard usage frequently experienced on haulage and coal-cutting equipment.

in turn is equipped with a railroad-type concentrated filament standard base lamp and reflector. Provision is made for locking the entire outfit in order to guard against tampering in the mine.

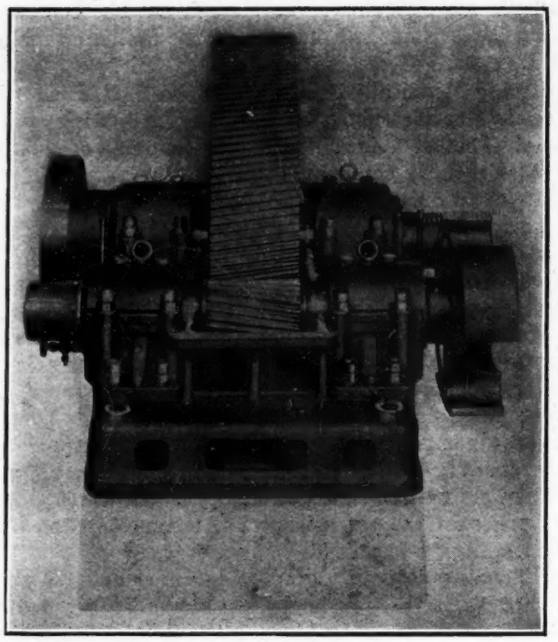
This headlight has received the approval of the U. S. Bureau of Mines at Pittsburgh, Pa., for use as flame-proof permissible equipment, having successfully met all requirements and withstood the necessary tests.

Helical Reduction Gear Unit

VARIOUS means have been adopted for reducing speeds of motors to drive slow-moving machinery and equipment around the mine, but a helical reduction gear unit, made by the R. D. Nuttall Co. of Pittsburgh, Pa., embodies the advantages of the helical gear.

The unit is made up of a gear and pinion meshed together and held in position by heavy bearings. The complete unit includes a casing which makes the gearing safe, free from dirt or falling bodies and provides a space for returning the lubricant. When the cover is over the gears, aside from giving complete protection it prevents spillage of the lubricant and permits a clean installation to be made in any place.

The slight angle of the teeth on the gear and pinion



SPEED-REDUCING UNIT

Helical gears result in smooth running. This unit economizes space and makes possible a safe installation that needs little attention or maintenance.

provides a condition which results in quiet running and no impact, insuring long life and even wear.

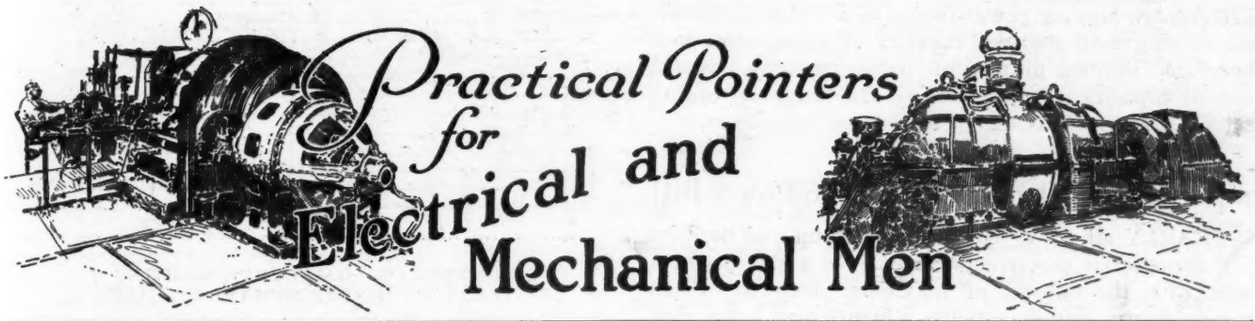
Its main field of application probably will be for screen, shaker, jig and fan drives. In these cases its application will permit the installation of the motor near the driven machine and result in economy of space and greater safety.

Flexible Drive Shafting

THE increased use of small electric motor-driven appliances has created a demand for flexible drive shafts and tubes. To meet this demand, the Stow Mfg. Co., of Binghamton, N. Y., have completed a line of sizes of flexible shafting which they are applying to a large variety of drives. Portable drills, tapping, reaming, wood-boring, grinding, and buffing machines, probably will be used more extensively around coal mines and in machine shops in the future, as the economy of carrying the tool to the job instead of the job to the machine is realized. The advantage of having the driver remote from the tool in confined places favors the use of flexible shafting, and it is in such applications that the shafting will have its greatest use.

OPERATING A PORTABLE GRINDER

The flexible shaft permits the application of electrical energy to repair processes that heretofore have been almost invariably done by hand.



Important Considerations in Making Insulation Tests

ELECTRICAL equipment employed at a coal mine is called upon to operate under conditions that make it essential to maintain close supervision not only in order to detect or avert mechanical damage but also deterioration of the insulation. The atmospheric conditions often vary between one portion of the mine and another. In the intake airways the temperature is normal and the moisture content of the air is unlikely to cause insulation damage as quickly as in the return airways, where moisture in the air often is excessive.

Regardless of the situation in which apparatus may have to work, however, it is essential, in order to avoid unexpected breakdowns, to make insulation tests regularly and record the results so that any falling off in resistance may be detected and the proper steps taken to prevent a breakdown.

For ascertaining insulation resistance the equipment usually employed consists of a magneto and an ohmmeter. These devices may or may not be combined in a single unit for the sake of portability. In any case the apparatus has two terminals, one of which is sometimes marked "line" and the other "earth." The terminal marked "line" should be connected during a trial to the winding of the apparatus to be tested, but the terminal marked "earth" should not be joined merely to some object that is grounded, for this procedure may lead to unreliable results and give a false indication. Provided each piece of apparatus has a ground wire attached to its frame it makes no difference whether the "earth" terminal of the testing set is connected to the frame or some other grounded object some yards away. There is always a possibility, however, of a ground connection being broken. The results of an insulation test in such a case might be misleading unless the earth terminal is connected direct to the frame of the apparatus being tested.

Thus equipment that is mounted on a dry concrete foundation may be completely insulated from the earth. The same applies to equipment set on a wood foundation, assuming in both instances that no ground exists. Obviously, in either of these cases, if, when making an insulation test, the "line" wire from the testing set is connected to the apparatus while the "earth" terminal is fastened to some grounded metal work remote from the frame of the machine itself, a break exists in the circuit a comparatively high insulation resistance will be indicated even though the insulation of the apparatus may be actually low, permitting leakage to the frame.

In view of such a possibility the safest way to test all apparatus underground where illumination is poor and broken ground connections may escape detection is to make insulation tests by habitually connecting one wire to the machine windings and the other to the framework of the apparatus itself. Similar precautions should be taken in all kinds of testing. Unnecessary emphasis may seem to be laid on this detail, but experience has shown that an intelligent use of a testing set is not always the rule.

Effect of Low Lagging Power-Factor

WILL you kindly give in your columns a discussion on the subject of low lagging power-factor and how it affects the operation of transformers and generators. I am interested to have shown how it affects regulation and efficiency, also how it affects the load which the equipment can carry. ELECTRICIAN.

Transformers are rated in kva. output; a 100-kva. transformer is supposed to deliver 100 kw. at unity power-factor at normal voltage and at normal temperatures; but if the power-factor should be lagging 60 per cent, the energy output of the transformer would be only 60 kw. and yet the current, and consequently the heating, would be approximately the same as when delivering 100 kw. at unity power-factor.

The regulation of transformers is inherently good, being for small lighting transformers about 1½ to 3 per cent for a load of unity power-factor and about 3 to 5 per cent at 70 per cent power-factor. Large transformers with a regulation of 1½ per cent at unity power-factor load would have about 6 to 8 per cent voltage regulation at 70 per cent power-factor.

Alternating-current generators also are rated in kva., usually at any value of power-factor between unity and 80 per cent. The deleterious effects of low-power-factor loads on alternating-current generators are even more marked than on transformers. They are decreased kw. capacity, decreased efficiency, impaired voltage regulation as well as the necessity for increased exciter capacity.

Assume the case of a generator designed for 80-per cent power-factor supplying a circuit whose power-factor is 60 per cent. It is probable that normal voltage at the rated ampere output could be obtained only with difficulty, even though at this power-factor the generator would only be delivering 75 per cent of its rated kilowatt load. The field losses and, therefore, the field heating of the alternator, when delivering rated voltage and current are greater at lagging power-factor than at unity. Increased losses and decreased energy output both cause a reduction in efficiency. The regulation of modern alternating-current generators usually is about 15 per cent at unity and about 30 per cent at 80 per cent power-factor lagging. The operation of transmission lines and cables at a low power-factor also results in lower kilowatt carrying capacity, lower efficiency and increased voltage drop.

Hence, low lagging power-factor on a system generally will mean greatly reduced capacity of generators, and, therefore, limited output of prime movers, greatly reduced capacity of transformers and lines, as well as increased energy loss and poor voltage regulation.

Importance of Demand Charge on Power Bill

NEARLY all power contracts made up and used by the electric power companies have a clause which deals with the subject of maximum demand. From various electric-supply catalogs which I have I find that there are such things as 5-, 10-, 15- and 30-minute maximum demands, yet there is not sufficient information in the catalogs to give a clear idea of just what is meant by maximum demand.

For years our company has been buying power on a contract which has in it a clause on maximum demand, yet I have been unable to find anyone around the colliery who can explain what it means and how it is obtained. The bills are paid each month and it is a sure thing that the maximum demand greatly influences the amount of the power bill. I have noticed at times that the actual power consumption is sometimes lower than at other times, and yet the power bill is higher. I am told that this is due to some effect produced by the maximum demand.

The situation is that here is an important factor in the power bill which costs real money in its effect on the power bill and yet it is not understood, and, consequently, not being understood, nothing can be done to keep the power bill down.

This is so strange a situation that I believe an explanation in your columns would be most interesting. At present it appears as if we are paying for something we are not getting and this is a means for holding the power bill at a high charge when the power consumption is low and therefore the bill ought to be low.

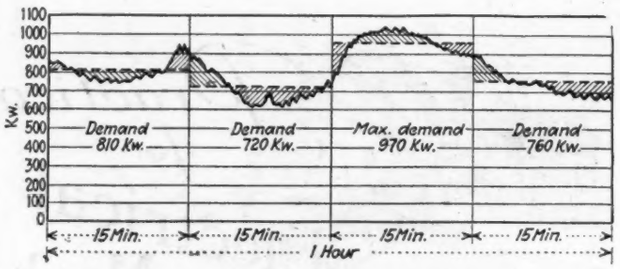
ELECTRICIAN.

Maximum demand, in electrical language, means the greatest average use of power during a certain agreed interval of time, 15 minutes being the period usually chosen. For example, the figure shows a curve indicating the irregular use of power during a one-hour period of operation of a coal mine. For the first 15-minute period the demand meter shows a maximum demand of 810 kw. Note that the maximum instantaneous peak is about 950 and the lowest point is 720 kw. What the demand meter does is to average all the instantaneous loads during the 15-minute period, or in other words integrates the load during that period.

Another way of visualizing what the maximum demand meter does is that it balances the oppositely cross-hatched areas and registers the location or value of the line which balances these two areas. The maximum 15-minute demand during the one-hour period shown in the figure obviously is during the third 15-minute period and its amount is 970 kw.

When the demand is on a 5-, 10-, 15- or 30-minute basis this means that the meter establishes an average over every 5-, 10-, 15- or 30-minute period during the whole period that the meter is installed.

Obviously, if a load is constant the maximum demand would be the same whether measured on a 5- or 30-minute basis, but when the load is irregular, the shorter the time interval the greater will be the maximum demand because there will be less opportunity for low



SECTION OF LOAD CURVE SHOWING 15-MINUTE DEMANDS

Maximum demand is the average 15-minute maximum load established during the metering period, it being an average of all the instantaneous demands during any 15-minute period.

instantaneous points to average down the high peaks which occur. When the time interval over which the maximum demand is obtained is long, there are more low points on the irregular load curve to help average down the high load points. This being the case, it is more desirable for a purchaser of electric power to have his demand established over a 15-minute period than over a 10-minute period.

For the power company to supply its customers it must have a certain generator capacity in its power house, and one purpose of the demand meter is to determine how much generating capacity is needed for each customer; and each customer is then charged an amount which in part is proportional to the generating capacity installed in the power house for his particular load.

A high maximum demand when once established usually is held by the power company as being the maximum demand for billing for several months due to the fact that if once established by the consumer it is necessary for the power company to be ready at all times for this load and necessarily it must keep in reserve the capacity required for carrying this load again.

Usually the power bill is made up of two separate charges, one being the demand charge and the other the energy charge. If the demand is relatively low the demand charge is low regardless of the energy consumption and energy charge. If the demand is high the demand charge will be high. For this reason it may occur that a high demand may be established during a certain month when the energy consumption is low and the preponderance of the demand charge will make the power bill higher than in another month when demand is relatively low and energy consumption high.

In most power schedules the charge per kilowatt of demand is at least about $1.50. From this is is apparent that a continuous load of 100 kw. such as a pump will cost the consumer a demand charge of $150 a month to run if it is run at a period when the other power-consuming apparatus is establishing its maximum. An important consideration at this point is that the cost to run this pump will be at least $150 if the pump is run for as short an interval as only the 15-minute maximum demand period. The proper thing to do is to operate such equipment during the night if possible or at some time when the load on the other equipment is low.

For abnormal peak loads established during some accident, such as a ground on the system, most power companies make due allowance which the consumer should take advantage of by properly identifying the period during which this accidental demand was established.

Problems of Operating Men

Edited by James T. Beard

Working Two Steeply Pitching Seams of Coal

General Outline of Conditions—Seams Reached by Double-Track Tunnel—Gangway Levels and Counters with Headings Driven to Rise

REFERRING to the inquiry of L. L. Travis, *Coal Age*, June 7, p. 942, allow me to suggest a plan that will apply to the working of steeply pitching seams such as he has described, assuming that both seams are gaseous, under the conditions prevailing in the locality from which he writes (Utah).

The five- and six-foot seams of coal mentioned are said to have an inclination of 45 deg. and to be separated by 125 ft. of solid strata, the hangingwall and footwall being each massive sandstone 20 ft. in thickness. As stated by the editor, it would have been helpful to know the exact physical conditions affecting the situation; but I will assume the proposition corresponds to the profile he has shown on page 942.

In addition to what has been said in the reply to this inquiry, allow me to suggest that this property should be opened and developed by two crosscut tunnels, one 7 ft. high and 16 ft. wide, to be used as the main haulage road and equipped with two tracks having an ample clearance on each side and between them.

Providing for Large Future Tonnages

The road should have a grade of 8 in. per 100 ft., in favor of the loaded cars, and be well drained by a good ditch. This will make ample provision for an output of from 3,000 to 5,000 tons of coal per day when both seams have been fully developed.

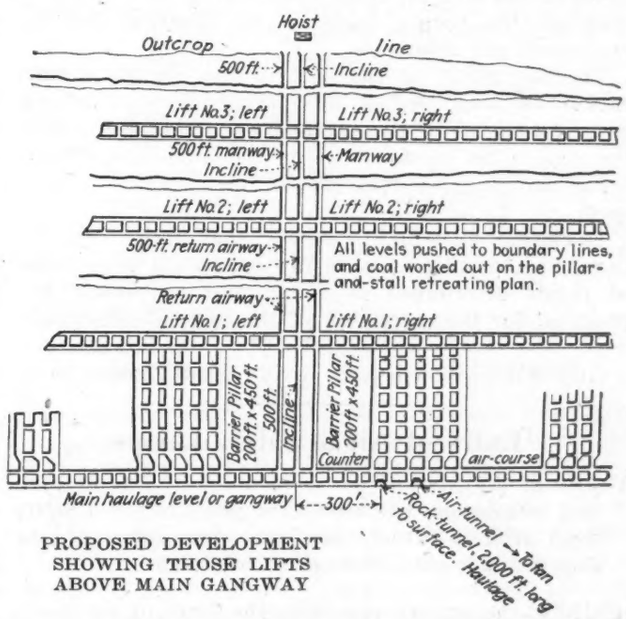
The other tunnel, which will be used as a gangway and intake air-course for the ventilation of the mine should be driven 8 ft. 4 in. high, in the clear, and 12 ft. wide, giving a sectional area of 100 sq.ft. This opening also should be ditched on one side for drainage. In my opinion, it would not be good mining practice to open this property with a single tunnel, with an airway or manway bratticed off on one side, which would be hard to make air-tight.

Assuming, as stated, the cross-tunnel is driven at a 2,000-ft. level, it would be necessary to drive two tunnels as I have suggested, in order to comply with the state mining law in respect to providing a second opening. The state law of Utah (Sec. 1513) forbids the employment of any person or persons as workmen in a mine, unless there are provided two distinct openings for each seam of coal worked. These openings must be separated by not less than 150 ft. of solid strata, at the surface, and not less than 30 ft., at any point where they are available in the mine.

An experience of 30 years in the working of pitching seams has taught me that where these are properly developed, they are capable of very large production. In the present case, when the cross-tunnel has reached the lower seam, gangways or levels should be turned to the right and left in that seam and counter levels driven 50 ft. above, as measured on the pitch of the seam.

The main entry should be 7x12 ft., in section, and the counter levels or air-courses 7x10 ft., in section. Owing to the massive sandstone hangingwall, these entries will require very little timber. It should only be necessary to set posts, about 5 ft. apart, along the high side of the entry where the coal has to be lagged to keep it from falling on the track or floor of the opening.

In order to provide some immediate return on the large sum of money expended in the development thus far, in driving 2,000 ft. of double rock tunnel, the



PROPOSED DEVELOPMENT SHOWING THOSE LIFTS ABOVE MAIN GANGWAY

lower lift of 500 ft. should be opened up in the under seam at once, by driving rooms 25 ft. wide, with 40-ft. pillars between them, and connected with crosscuts every 60 ft., measured on the full pitch of the seam, as I have indicated in the accompanying figure.

Again, while this necessary work is going on to supply needed coal, three raises should be started at a point 300 ft. from where the rock tunnel struck the coal. This distance will provide ample room for the side tracks required to handle the coal that will come from the upper lifts, later, when these are developed. The center one of these three raises should be driven 15 ft. wide and used as an incline to drop the coal from the different levels to the gangway below. These levels are located 500 ft. apart, measured on the pitch of the seam.

The two side raises flanking this incline should be 15 ft. wide and used as air-courses for their respective sides of the mine. A manway should be provided in

each by running a brattice 3 ft. from the rib and building a stairway for safe and easy climbing to reach the different levels.

It should be stated, here, that these upper levels are not to be started, until the incline and air-courses have reached the surface, where an electric hoist must be established at the mouth of the incline. This hoist should be capable of dropping five-car trips from any level to the gangway below, the cars being each of three tons capacity.

As soon as this is done, work on the several levels or lifts can be started and these entries should then be pushed forward to the boundary lines. A sufficient number of rooms should be opened on each lift to give the desired tonnage of coal. The rooms on the several lifts can be driven up in pairs with large panel pillars between them, say two rooms to every panel of 300 ft.

Retreating System Most Practicable

My plan would be to start from the boundary and work out the coal on the pillar-and-stall, retreating system. I believe this would prove the most economical and practical method of working these two seams. Care should be observed to keep the workings in the upper levels in advance of those in the levels below, and to maintain the proper angle of the breaking line, as experience will determine.

The extraction of the coal in the overlying seam should be accomplished by driving crosscut tunnels from each level to the seam above, which will enable the coal to be brought out on the level in the seam below and dropped down the incline provided in that seam.

In closing, allow me to suggest that if this property is very extensive a series of inclines should be provided at points determined as being most convenient and practical for the extraction of the coal in both seams.

J. W. Powell,
Glen White, W. Va. Shaft Contractor.

Entry of Air to Safety Lamps

Continual diffusion of gas prevents clear line of division between gas and air—Experiment to test a safety lamp with a carbide lamp to show entry of gas does not take place through the chimney.

SINCE the inquiry regarding the entry of air into a safety lamp was published in *Coal Age*, Feb. 8, p. 260, a number of letters have appeared in reference to the matter. In one of these, in particular, the attempt is made to show that much of the air entering a safety lamp passes through the mesh of the gauze just above the glass cylinder.

The writer of one letter (May 10, p. 761) in explaining that the purpose of providing entry for the air below the flame was to lessen the tendency of the lamp to smoke by reducing the conflict between the ascending and descending currents, strongly urged that there is always "a primary ascending current and a secondary descending current" within the combustion chamber of every safety lamp of the general type of the Wolf and the Koehler lamps.

Several years of practical experience with different makes of lamps, particularly the Koehler, in both the anthracite and bituminous fields, has convinced me that the entrance of air to the combustion chamber of either the Wolf or the Koehler lamp is practically confined to the ports of entry below the flame and that no appreciable amount of air enters these lamps through the mesh of the gauze chimney.

In raising this question as to the entry of air into a safety lamp, the inquirer mentions a test made with a Burrell gas detector when the end of the rubber tube attached to that device was held on a level with the top of the safety lamp chimney, close to the roof in the mine. In this position the detector showed 1.7 per cent of gas and a faint cap was observed in the lamp. Then, on lowering both the lamp and the detector about ten inches, no trace of gas was found.

Rapid Diffusion Prevents Clear Dividing Line

To my mind, this result was plainly due to the diffusion of the gas collected at the roof. Personally, I do not believe there is ever formed a distinct line of division between an accumulated body or layer of gas and the air, owing to the continual diffusion that is taking place between the two, as has often been explained in the columns of *Coal Age*. Any movement of a person walking in an entry or raising a lamp towards the roof very naturally disturbs the gas and causes it to mix more rapidly with the air.

On many occasions I have gone into places where, on lifting my lamp towards the roof no indication of gas could be observed until I blew gently against the roof and was then able to detect a faint cap on the flame of the lamp. These instances show that a thin layer of gas at the roof will not enter the top of the lamp; but blowing against the roof brought the gas down to where it entered with the air at the ports of entry below the flame.

Some may ask, "If diffusion was continually taking place between the gas and the air why was it necessary to blow the gas from the roof, in this case?" My answer is that the layer of gas at the roof was very thin and the zone of diffusion did not extend low enough to enter the ports of entry below the flame. It is my belief that the discharge of the heated air and products of combustion through the gauze chimney of a lamp prevents the entry of air or gas at that point, under all ordinary conditions.

Testing a Safety Lamp with a Carbide Lamp

After reading the several letters setting forth the views of writers on this subject, I decided to make the experiment of testing my safety lamp with the acetylene gas generated in a carbide lamp, after the manner that some readers will recall was described in a previous issue of *Coal Age* (Vol. 22, p. 760), under the title "Testing a Safety Lamp with a Carbide Lamp."

For that purpose, having assembled and lighted my safety lamp, I charged the carbide lamp with fresh carbide and turned on the water but did not light that lamp. Holding the carbide lamp in a position near the top of the safety and allowing the gas generated by the action of the water on the carbide to play about the chimney of the safety lamp, there were no apparent results, as the flame gave no indication of the presence of the gas.

However, on lowering the carbide lamp to a point near the level of the ports of entry below the flame there at once followed a series of minature explosions within the combustion chamber. I concluded that if the gas-charged air, which surrounded the chimney in the first case, could have entered through the mesh of the gauze the same small explosions would have been

produced within the lamp, as in the second case. Let me say that this is offered in no spirit of criticism but in the hope of shedding further light on a most important subject. REESE THOMAS.

Royalton, Ill.

Inquiries Of General Interest

Machine Mining When Working Steep Pitches

Difficulty in Keeping Machine Up to Its Work—Suggests Use of Cable and Winch Located Above Panel and Operated by Control Switch on Machine

READING the inquiry of L. L. Travis that appeared in *Coal Age*, June 7, p. 942, regarding the working of two seams having an inclination of 45 deg. reminds me of a proposition of another kind with which we are confronted in the working of a seam of coal on an equally steep pitch.

In regard to the best method of working out the coal on such steep inclinations, allow me to suggest that our experience has proved quite conclusively that the longwall retreating panel system is the most satisfactory method to adopt, provided the conditions are such as to admit of applying that system successfully. Our proposition differs from that described by Mr. Travis only in the fact that our mine is opened on a slope, which avoids the necessity of driving the long rock tunnel he mentioned.

In my opinion, the adoption of a system of mining that is capable of recovering the largest possible percentage of lump sizes is of paramount importance. After carefully considering the adaptation of different methods of mining the coal and being forced to admit the limitations of the punching machine, our choice fell on the chain machine as being the best means of cutting the coal.

However, the use of a chain coal cutter, on a 45-deg. pitch, presents one almost insurmountable difficulty and that is, keeping the machine up to its work. After trying different means of overcoming this trouble, a scheme has suggested itself to my mind that I would like to present for the consideration of *Coal Age* readers, many of whom have doubtless become expert coal cutters, under varying conditions.

My idea is to develop a chain machine containing, within itself, only the mechanism for driving the cutter chain. This machine would be attached to and supported by a cable dropped down the incline, from a winch located on the level above the panel being worked. The operation of the winch is to be controlled by a switch on the coal-cutting machine, within ready reach of the operator or machine runner.

It is needless to say that this winch must be a very slow-speed affair, designed to meet the conditions required where a slow winding drum is electrically operated. In this plan, it is clear that the coal forming a panel would be taken out in consecutive skips reaching from the bottom to the top of the panel. The machine can be held into the face of the coal by the post and chute boards usually built on such a pitch, for conducting the coal to the mine cars in the level below the panel.

Allow me to ask of *Coal Age* and its readers if this scheme appeals to them as having any value that would recommend its trial and adoption where conditions will permit. As far as my knowledge goes, the greatest difficulty, in the application of longwall chain machines to the cutting of coal on heavy pitches, is the inability of the machine to feed forward without containing within itself such a heavy driving mechanism as to make it cumbersome and difficult to handle.

Seattle, Wash. WILLIAM STRAIN.

It is not clear what plan this correspondent has in mind, regarding pillar support on the upper side of the panel. In working out the coal on a longwall retreating panel system, where a mine has been opened by a slope driven on the full dip of the seam, it is assumed that the extraction proceeds, lift by lift, in regular order, from the surface downward, leaving sufficient pillar protection at the outcrop to prevent surface drainage from entering the mine.

In this plan, it is natural to assume that the gangway levels are driven to the right and left of the slope and extended to the boundary lines, where the panel is cut across between two consecutive lifts and a longwall face opened extending from bottom to top of panel, on the full pitch of the seam.

Assuming the conditions in the roof and floor of the coal are favorable, it would seem that the correspondent's plan has merits that would recommend its trial in any particular place. *Coal Age* will be glad to receive comments giving the opinion of its practical readers who have had experience in the operation of coal produced on steep pitches.

Can Blackdamp Become Explosive

Reduction of carbon dioxide to carbon monoxide makes mixture explosive—Coal dust suspended in air and rendered incandescent by flame the active agent.

THERE has been some discussion here, recently, regarding the question of whether a body of blackdamp can be transformed into an explosive mixture, under any conditions that can possibly exist in the mine. The contention of a few that this is possible has led us to submit the question to *Coal Age*, hoping for information that will settle the dispute. STUDENT.

Houston, Pa.

It is true that, under the conditions existing in a mine at the moment of an explosion in which coal dust has played an important part, the carbon dioxide (CO_2) formed by the explosion may be reduced to carbon monoxide (CO), owing to the presence of large quantities of incandescent particles of carbon (coal dust) floating in the air. However, this fact can hardly be taken as answering the question, whether blackdamp can be rendered explosive under conditions that may exist in the mine.

As is well known, blackdamp is a mixture of carbon dioxide and air. Such a mixture is deficient in oxygen by reason of the presence of the gas. Assuming that the blackdamp in question has been produced by other causes and is not the immediate result of an explosion,

it can be stated that the mixture cannot be rendered explosive under any conditions that may commonly exist in the atmosphere of a mine. The condition, in such a case, is quite different from that resulting in the production of carbon dioxide in the presence of quantities of coal dust floating in the air and rendered incandescent by the flame of the explosion.

In this latter case the mixture formed by the explosion can hardly be described as blackdamp, although having much the same composition except for the presence of the incandescent carbon particles, which are the active agent in the reduction of the carbon dioxide to carbon monoxide and the formation of an explosive condition on the addition of fresh air. Therefore, in answer to the question asked, we would say that, in the general understanding of the term "blackdamp," such a mixture cannot be rendered explosive under conditions that commonly exist in a mine.

Examination Questions Answered

Miscellaneous Questions

(Answered by Request)

QUESTION—*An entry has 17 working rooms. Rooms 11 and 12 are full of gas. Men are working in Rooms 13 to 17, inclusive, also in the entry and air-course. State how you would remove this gas, the air being conducted on the split system.*

ANSWER—Before making any attempt to disturb the gas accumulated in Rooms 11 and 12, notify the men working inby of these rooms to extinguish their lights and withdraw promptly and as quietly as possible. At the same time, notify all the men working on those entries to withdraw from the mine. This being done and having selected reliable and experienced men to assist him, the fireboss should station a man at the mouth of the entries with instructions to permit no one to enter.

Then, having increased the circulation as far as this can be done with safety to other sections of the mine, proceed to turn practically all of the air into Room 11, by building a brattice or hanging a canvas just inby from the mouth of that room. Use none but approved safety lamps that have been carefully examined before starting the work. If necessary, extend brattice up the mouth of the room or start it from the outside rib of the last open crosscut between that room and No. 12. The brattice should be extended gradually toward the face, keeping a careful watch of the lamps and making frequent tests to determine the progress of the work.

When all the gas has been driven from the face of Room 11, the same work must be performed in Room 12, by extending the brattice gradually, from the outside rib of the same crosscut to near the face of Room 12. It may be a good plan to hang a canvas in the last open break through between Rooms 12 and 13, in order to prevent the gas from passing out through the last four rooms on these entries. If convenient to do so, a crosscut on the entries may be opened to allow the gas to pass at once into the return air-course.

Finally, the work must be continued from room to room and at the face of the two entries, until all the places have been swept clear of gas. Every place on these two entries must be carefully examined and found to be safe for work before men are again permitted to enter.

QUESTION—*What do you assign as the cause of the greatest number of explosions of firedamp?*

ANSWER—Probably the greatest number of gas explosions have been caused by the careless use of open lights in places supposed to be free from gas or generating but a small amount not considered dangerous. Another frequent cause of explosions of gas is the use of defective safety lamps. A third but less frequent cause is due to the presence of matches and smoking material carried into the mine in violation of the rules and regulations of the place.

QUESTION—*How would you conduct your examination of a gaseous mine to ascertain its true condition?*

ANSWER—Equipped with an approved type of safety lamp that has been carefully examined, assembled, lighted and tested, the examiner should enter the mine or section to be examined and follow the intake air throughout its course, having first noted that the usual quantity of air is in circulation and passing into the section. Each entry, passageway and working face should be examined for all possible dangers that may exist. A careful test for gas must be made at or near the working face of each place examined and the roof and coal closely inspected and its condition noted. Where bad top is found this should be marked to be taken down or made secure by timbers. The quantity of timber, posts and tracks should be noted in each working place.

QUESTION—*Describe the different systems of ventilation in use.*

ANSWER—Aside from natural and furnace ventilation employed under conditions favorable to their use, the two general systems of ventilation are known as the blowing and the exhaust systems, respectively. In the blowing system, the mine is ventilated under a pressure greater than that of the atmosphere. By means of a fan air is forced into the mine against the frictional resistance of the airways, which must be overcome by the pressure due to the action of the fan.

In the exhaust system of ventilation, the mine is ventilated under a pressure below that of the atmosphere. In this case, the action of the fan creates a depression in the fan drift; and the atmospheric pressure, acting on the other opening, forces the air into the mine against the frictional resistance of the airways. The ventilating pressure is then the difference between the atmospheric pressure and the vacuum or depression created by the fan.

QUESTION—*If certain working places in a mine generated gas frequently and other working places gave off little gas, which would you examine first in making your rounds in the morning and for what reason?*

ANSWER—In the absence of other reasons that would change the order of the examination, a fireboss should first examine the places generating little gas, leaving those generating gas in larger quantities until the last. The reason for this is that there is more danger of gas accumulating in places generating gas freely, between the time of making the examination and the entrance of the men for work. If these places are left and examined last their condition when the men enter for work will correspond more closely to that found by the fireboss in his examination.

Mine Inspectors Talk Safety from Many Angles In Convention at Pittsburg, Kansas

Firing mine shots by radio, making mine electrical machinery and equipment really safe, using water effectively to reduce "bug dust" in machine cutting, training men to be real miners instead of dangerous novices—such subjects as these were discussed by the Mine Inspectors' Institute of America at its Pittsburg (Kan.) convention, July 10-12, in such a way as to be helpful to coal mining. The essentials of the convention were reported in last week's *Coal Age*, but much of the discussion was left for this issue.

Inspector James Dalrymple, of Colorado, took the lid off. He had tried since last summer's convention to sound out Colorado opinion on what should be done to lessen the hazards of running electrical machines, but got only eleven answers from sixty letters. Eight were for limiting the use of such machines only in most gaseous mines, and against any other limitation. Eight also were for putting machines under strict requirements to make them permissible before they could be sold.

Mr. Dalrymple's own opinion is that insulation is the most important factor in electrical safety. He believes 95 per cent of insulation is bad. In wet places he thinks cable, for instance, would be safer if it were bare because moisture damages practically all insulation; he believes the miner puts too much confidence in it. That is the reason in the last nine years in Colorado seventeen men have been electrocuted by trolley wires and twenty-four by new insulated wires.

"We should have all electrical machines the safest that it is possible to build," said he, "and passed upon by the Bureau of Mines, not merely by the manufacturer, who is financially interested."

Would Equip Fans with Auxiliary Power

He held that ventilating fans should all be equipped with auxiliary power. In Colorado power goes off so frequently that a fan without auxiliary power is dangerous. Gasoline-engine auxiliaries are going to be advocated for Colorado by a joint conference of insurance-company inspectors and state inspectors. In nine years ten Colorado miners have died because of fan failure and something must be done about it.

President Lambie, in the discussion, suggested that to make machines in mines conform to permissible regulations every machine should be examined by a Bureau of Mines man after delivery at the mine where it is to be used. Dr. J. J. Rutledge, chief of the Maryland Bureau of Mines and long in the government service, said that at present the U. S. Bureau checks up on permissible explosives manufacturers by surprise tests and that possibly the electrical section does the same thing on electrical machines that bear the Bureau's approval of design, but that a real source of trouble lies in the fact that manufacturers nowadays adopt their own "permissible" standards and so label their output. This often confuses the buyer and the miner.

"There should be government standards for everything electrical," contributed Chief Inspector James Sherwood of Kansas, "and they should be rigidly enforced." He thinks the practice of snipping cable connections onto trolley lines should be prohibited along with all other uninsulated connections. His opinion is that danger from electricity increased when direct current began to give way to alternating current. Line surges too short to damage machines have killed men on circuits with voltages as low as 110. Dr. Rutledge suggested that storage-battery cutting machines are practical and should be safe enough for anybody.

"But when all is said and done," offered Martin Bolt, assistant director of the Illinois Department of Mines and Minerals, "what are we inspectors to decide when electrical engineers can't agree on what should be done?" Inspector V. E. Sullivan, of West Virginia, said inspectors at least could do their best by publicity to advertise the dangers of electricity and keep miners on the watch.

Before the end of the convention the institute, although disapproving Mr. Dalrymple's contention that all electrical machinery and equipment should be made permissible by the Bureau of Mines, resolved that the bureau be requested to make every possible effort to discover means to make such equipment "as safe as possible."

A novel plan of wetting "bug dust" was reported in use by the Tennessee Coal & Iron Co. Frank Hillman of the Woodward Coal & Coke Co. of Alabama said the scheme is to loosen the plates on the cutter bar of a mining machine and lay in the groove therein a ½-in. pipe. Water playing out the open end of this pipe is right at the cutting point and is carried into the kerf and mixed with the dust much more thoroughly than by merely running water on the top of the cutter bar. The machine dust comes out as mud and is therefore thoroughly wet down and as little dangerous as dust can be.

The institute so thoroughly approved of this plan that it passed a resolution mentioning the scheme and favoring "the application of water wherever practicably possible," especially in cutting. The word "practicably" was inserted after it was considered that in some fields water is scarce and expensive.

Mr. Hillman said washing down not only floor but ribs and roof and the tops of outgoing loads in Woodward mines is regularly practiced. This is considered good protection against both the start and the spread of explosions. In the Dolomite blast, he said, it was significant that the explosion traveled only 400 ft. from the bottom into the mine.

Mr. Sullivan contributed the information that dust explodes because of the gases in it. They invariably travel up an incoming air stream because the oxygen in the new air forms the nucleus for combustion from the initial flame.

Rock-dust "barriers" made famous by the old Ben Coal Corporation in Illinois "are all right, but they can't prevent a blast from starting," according to Inspector Hoey, of a southern Illinois inspection district. "You can't put them close enough to the face," said he. "They must be hung over panel entries. I know of them stopping just one explosion and that was at night when nobody was around. What if the regular thirty-two men had been on duty in that pair of entries just then? They would have died, no doubt. So it is necessary to prevent blasts at the source."

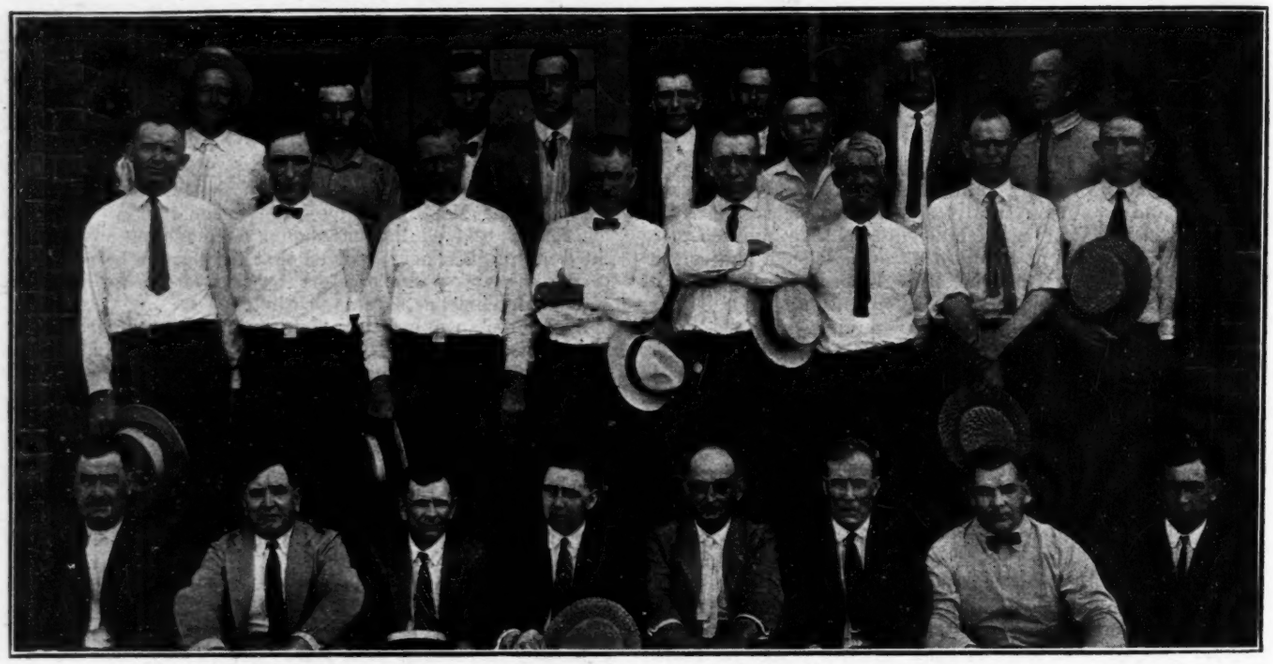
Salt stemming helps in Kansas, Inspector James Sherwood said. Mr. Bolt told of locomotive sand along a haulage way acting as a rock-dust barrier, stopping an explosion in Old Ben No. 11 mine.

Would Bar Black Powder as Menace

It was almost unanimously agreed that black powder is a menace to any mine and should be barred forever, even though it often permits of getting out a bigger percentage of lump.

Compelling men to be safe is difficult business, but there are some methods worth trying, Secretary J. J. Walsh, of the Pennsylvania Bureau of Mines, said in his letter to the convention. Notwithstanding all the Pennsylvania laws and rules, accidents occur with appalling frequency, largely because men become indifferent to danger by constant association with it. This, he said, is particularly true regarding roof-fall accidents, which cause about 50 per cent of the state's casualties each year.

"What can be done?" he queries. "It is doubtful if additional legislation would prove of much benefit, for the reason that the laws already in force, if strictly obeyed, would insure the safety of the men who are taking down coal. The only thing that can be done to lessen the casualties that occur from this cause is to bring the workmen to a clearer sense of their responsibility. More competent and careful supervision by the mine officials also would be help-



OFFICERS OF MINE INSPECTORS' INSTITUTE OF AMERICA AND SOME OF THOSE IN ATTENDANCE AT THE CONVENTION IN PITTSBURG, KAN.

Front row, left to right: Dr. J. J. Rutledge, director of the Maryland Bureau of Mines, Institute treasurer; Martin Bolt, Assistant Director, Illinois Department of Mines and Minerals, Institute secretary; Frank Hillman, safety engineer for Woodward Coal & Coke Co., second vice-president of the Institute; R. M. Lambie, West Virginia chief mine inspector, retired president of the institute; James Sherwood, Kansas chief mine inspector, new president; James Dalrymple, Colorado chief inspector, first vice-president; E. J. Hoey, Illinois district inspector, third vice-president, and J. S. Rogers, assistant secretary.

ful. Both employees and officials grow careless in their work and there is need for discipline that will strictly enforce obedience to the laws and rules governing safety—discipline that metes out severe punishment to the men in charge and to the employees who, by carelessness and recklessness, place in constant jeopardy the lives of the men in the mines.

"A specific suggestion may be made in urging more systematic propping. The foreman and the superintendent should decide on the distance between the props, and the foreman or assistant should insist on strict compliance with the decisions thus made. When this is done the matter of safety then rests with the miner, and no person can do anything more to safeguard life unless it be the fireboss, assistant foreman or foreman who may happen to visit a place at a critical period and be able to give warning of impending danger. As the miner is alone at the face about 90 per cent of the time during the day, he should be taught how to protect his own life.

"It is the aim of our department in its effort to reduce accidents by falls to have more frequent examination of the different chambers in the mines. With the co-operation of the miners and the operators we hope to have the face of each chamber examined by the miner five or six times daily. This would mean more than 750,000 roof examinations every day in the mines of Pennsylvania,"

What effect does accident compensation have on accidents? The general feeling of the institute is that there has been no marked decrease. Everybody agreed that reported injuries—especially minor ones—have at least doubled, but that this does not prove actual injuries are any more numerous than they were before. Although compensation should have reduced accidents by bringing about stricter inspection and more rigid enforcement of safety rules through insurance-company pressure, this has by no means worked out.

There have been too many cases of coal companies paying an insurance penalty rather than spend the money to make specified safety improvements, according to Dr. Rutledge. He thinks state compensation commissions should have more power to stop that sort of thing. Mr. Sherwood said the abuse of compensation is general and that the cost to coal companies is shamefully high. Somebody is not enforcing the safety regulations, he declared, or accidents would be reduced 50 per cent.

Saying that compensation should reduce accidents but doesn't, Martin Bolt supplied the information that in Illinois the situation is so bad that old-line insurance companies have raised rates from $3.50 to about $6. There not only have reported minor accidents multiplied but reports of major hurts causing time losses of thirty days or more have doubled. Mr. Dalrymple suggested that miners should be made to bear 10 to 20 per cent of the cost instead of the operator bearing it all. That, he thought, would bring miners around to a sounder view of compensation.

The only man who had noted a reduction of accidents since compensation legislation went into effect was Frank Hillman, of non-union Alabama. He said his company, the Woodward Coal & Coke Co., gets real aid in inspection from insurance companies, and accidents in the state have been reduced.

The general sentiment was that unionism defeats much safety effort and that strict discipline by companies over miners would be a remedy.

Chief Inspector Sherwood advocated a codification of the mining laws of the nation in their safety provisions, declaring they should be uniform in all states except as to certain local details. One uniformity he proposed was a national certification of miners. Every man should pass an examination before he is permitted to enter a mine as a full-fledged miner.

"As it is now in Kansas," commented Mr. Sherwood of his own state, "an Italian can come out of New York with a bear and tambourine, leave the bear and tambourine at a mine mouth and go in as a miner. He is a constant danger not only to himself but to everybody else in the mine. All the operator can do about it is pay him and make sure the pay is on time. I believe every miner should be required to learn to read and write English so as to understand safety signs before he gets his miners' certificate. Also he should be required to possess a first-aid certificate. The issuance of such certificates should be in the hands of competent and unbiased persons and each certificate should be revokable at every violation of the safety regulations."

Mr. Bolt was for uniformity of as much as possible of mining laws, but not all features because there is too much variation between states. He favored first-aid certificates but issued only after a man had learned mining and had had underground experience. However, he knew the operators of the country would be against such a certification

plan, contending that it would seriously shorten the labor supply.

The apprentice system was Inspector Dalrymple's suggestion for the proper way to make new miners. No examining board can tell whether a man is careful and of good enough judgment to be fit to be a miner; only an instructor after long acquaintance with him could tell that. He also saw operator opposition to any extension of the mine-examining-board plan because through state boards the union can bar all non-union candidates. There was much favor among the inspectors for the apprentice plan, but J. S. Rogers feared it would merely permit a man to qualify a son or relative prematurely in order to increase the family income; but that the plan would be good if the instructor was allowed merely to say when a man was ready to take a state examination.

The service of the U. S. Bureau of Mines to the mine inspector and to the industry as a whole was discussed by Dr. Rutledge, who has been connected with the bureau fourteen years. He spoke of the valuable work the explosives section of the bureau had done to prove the constant danger of mine dust and to test and grant permits for permissible explosives. He prophesied that some day, through the bureau's research, the country will be firing shots safely by radio and will be using a granulated permissible producing as high a percentage of lump as does black powder.

Illustrating the service of the bureau's electrical section he told how its engineers broke no less than 20,000 lamps before their rigid requirements for lamps were fulfilled. The electric cap lamp alone is worth the whole cost of the section, he thinks. He prophesied it will some day give the industry a sparkless motor and safer mining machines and that one of its best gifts will be a thoroughly good electric shovel.

The chemical section has done many things for greater mine safety. It can tell in two hours after it receives a sample of air drawn from a sealed off fire section of a mine whether that section is safe to open. From its proximate analyses of coal samples it can determine the explosibility of the dust of that particular coal. Such determinations are dependable warnings to an operator of dangers to be guarded against.

The bureau's experimental mine 13 miles from Pittsburgh, Pa., has tried out almost everything imaginable in coal mining—explosive conditions, gasoline locomotives, underground automobiles.

"The bureau has done so much of direct benefit to mine inspectors," said Dr. Rutledge, "that it is hard to imagine anything else it could do. However, I think it should keep on broadening its scientific investigation. It should have demonstration mines in many fields. It should devote more time to demonstration of the best mining methods or soon our most scientific method of mining—the longwall—will be lost. Field men should supply confidential reports to state inspectors on accidents. I do not mean that the present system of issuing everything only from headquarters should be broken down, but I do believe state men should get confidential reports such as I mentioned."

Further, Dr. Rutledge urged solemnly that a uniform code of mine safety be worked out on the order of the boiler code of this country. There should be uniform methods of marking for all safety investigations also.

President Lambie declared one of the most beneficial things the bureau's engineers could do for the safety of mining would be to develop a machine that will eliminate explosives. If a machine is ever made efficient which can shear, undercut and pull down coal, not only will mines be much safer because roofs will not be loosened by shock, admitting gas and causing falls, but coal will be cleaner and bigger.

Mr. Dalrymple said the "hydraulic cartridge" machine developed in Colorado years ago may some day answer the purpose, especially if the Frick coal interests of Pennsylvania take it up for further development, as they now talk of doing.

W. D. Ryan, of the bureau's field force, spoke at the close of the Wednesday session, dealing with the good feeling that now generally exists between state and bureau men, declaring it should continue always.

Editors Favorable to Anthracite Report of Coal Commission

Most Papers Approve Recommendations—Stand on Nationalization Commended—Opinion Divided on Federal Operation in Emergency

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

If newspaper editorials reflect the opinion of the public, the U. S. Coal Commission's report has the approval of the vast majority of the people, for the comment favorable to the report grealy exceeds the criticisms. It is particularly noticeable that a large number of these editorials approve what the Commission has recommended and would go even further in the effort to insure a constant supply of coal. It is not only the newspaper that is elated over the election of Magnus Johnson which advocates doing what the Commission recommends and much more, but vigorous editorials to that end have appeared in the conservative papers of the country—publications which are outspoken against the radical tendencies which have flared up in the Middle West.

The returns from the clipping services indicate that an unusual amount of newspaper space has been given to this report and to editorials commenting on it. With few exceptions, they accept the Commission's belief that the mining and distribution of anthracite are matters which affect the public interest in a legal way and that there is an obligation of the part of mine operators and mine workers to give continuous service.

A few papers characterize the whole report as unfair and as constituting a dangerous precedent in its proposals which require publicity of accounts and otherwise allow the federal arm to be thrust into private business. Some editorials take the ground that the Commission has recommended nothing that is likely to be put into effect and as a consequence has wasted $600,000 of public money. Almost all of the editorials agree with the Commission's stand on nationalization.

Opinion is very much divided as to whether the President should be empowered to take over the operation of mines during an emergency. The opinion is expressed that the Federal Government would be no more successful in inducing the men to return to work than would be their regular employers. Nearly all editorial writers who touched on that point show skepticism as to the ability of the government to obtain anything like a normal production of coal. Some of the editorials reflect opposition to the compulsory divulgence of so-called business secrets.

Some of the newspapers, not unfriendly to the plan, doubt its feasibility because of the legal difficulties involved in attempting to establish federal control over mines or even to force publicity of accounts. In that connection attention was called to the fact that the Supreme Court of Indiana in passing upon the Fuel Commission Law of that state held in effect that the state has no authority to fix conditions of mining and to set prices on coal since the commodity is likely to be carried in interstate commerce. At about the same time a court in the District of Columbia ruled that the Federal Trade Commission has no right to demand production costs because mining is not interstate commerce.

In accordance with the plan already announced, the Commission has begun the issuance of some of the material on which its anthracite report was based. The first exhibit is the study of earnings of anthracite miners made by Miss Anne Bezanson. Other exhibits will be forthcoming at frequent intervals in the future.

Resume Anthracite Wage Conference

Representatives of the anthracite mine workers and operators resumed their conference at Atlantic City July 23 in an effort to arrange a new contract to replace that now in force, which will expire Aug. 31. The parleys were interrupted for ten days to permit the miners' representatives to attend the biennial convention at Wilkes-Barre.

Brief by Farrington to Coal Commission Blames "Gunmen" for Herrin Massacre

CHICAGO, July 24.—Frank Farrington, president of the Illinois mine workers' union, on July 21 made public a brief he was sending to the United States Coal Commission in answer to the brief of the Bituminous Operators' Special Committee, which condemned the union for its activities in connection with the Herrin massacre. Farrington's reply paints the operator of the Herrin strip mine in dark tones and his gunmen in deepest black. "The operator, W. J. Lester, had no business importing hired killers into a mining neighborhood, peacefully awaiting the end of the 1922 strike," says the brief, "and the gunmen had no business insulting and robbing people on the public highways near the strip mine and otherwise driving the naturally peaceful people of Williamson County to take up arms in self-defense." The authors of the brief express the hope that the slaughter which followed the capture of the mine guards will teach American industry that the day of the hired gunman is over.

Ask Rehearing of Assigned-Car Case

Application for a rehearing in the assigned-car case was made to the Interstate Commerce Commission Wednesday, July 18, by various of the subsidiaries of the United States Steel Corporation. In this application it is contended that the present record is insufficient to enable the commission to reach a fair conclusion in respect to the use of private coal cars by these concerns. The petition points out that not one pound of coal mined by the parties to the request is marketed, sold or shipped in competition with coal mined in the same or in adjacent districts. It is pointed out further that the nature of the manufacturing process requires continuous operation of steel plants. The distances between the plants and their coke ovens on the one hand and the mines on the other require the use of private cars to insure continuity of coal supply.

Counsel for the National Coal Association is engaged in the preparation of an answer to the brief of the railroads in the assigned-car case. The brief is being written by E. S. Ballard, of Butler, Lamb, Foster & Pope, of Chicago, who successfully prosecuted the case which resulted in the recent favorable decision.

Interior Official Denies Federal Coal Plan

A detailed plan for government operation of mines in the anthracite field has been prepared by the Bureau of Mines and Interior Department officials, says a front-page news article printed in the Washington *Evening Star* of Tuesday, July 24. The plan was worked out during the last strike, says the article, but can be put into effect in 24 hours, if needed. Acting Secretary of the Interior Finney authorized the Washington correspondent of *Coal Age* to deny the report absolutely. Further denial was made by Acting Director Dorsey A. Lyon, of the Bureau of Mines.

Alabama Union Fades; Autonomy Abrogated

The United Mine Workers of America abrogated the autonomy of District 20, having jurisdiction over Alabama territory, effective July 1. Inability of the district organization, after more than thirty years of existence, to be self-supporting was the reason assigned for suspending the autonomy of the district organization and the dropping of local officials from the payroll. The International union has placed International representatives in charge of the remaining remnant of union locals. The open shop is more strongly established in Alabama coal mines than ever before in the history of the industry and efforts to organize the mine workers of Alabama effectively has ever been signally ineffective, though the national organization has expended millions of dollars in Alabama on organization work and backing strikes, none of which was ever won by the union forces.

According to a statement released by the United Mine Workers, the U. S. Coal Commission has been asked by the miners' union to investigate conditions under which Alabama mining companies are said to employ convict labor. A letter made public July 22 by the United Mine Workers, carrying the petition, said that reports, "spread broadcast," indicated that convicts had been "compelled to suffer torture" in order that "non-union mining companies might reap a profit."

In addition, the union's letter asserted that "Alabama non-union coal companies have hammered wages of mine workers down since last year" and lowered costs of coal production, but at the same time had raised the prices of coal. The unnamed concerns were said to be "gouging the public pocketbook in shameless fashion."

Strike Situation in Nova Scotia Clearing

The situation in the bituminous-coal fields of Nova Scotia is "rapidly clearing up," according to a statement made July 22 by John L. Lewis, president of the United Mine Workers. Reports which Lewis has received from Provisional President Barrett indicate that in a dozen of the 100 local unions embraced in the district the miners have voted to return to work in obedience to the orders of the international president, and that in probably two-thirds of the remaining locals referendums have been started to allow every individual miner a chance to express either his allegiance to the authority of the international or his allegiance to the deposed officers of the district.

A factor in the speedy settlement of the Nova Scotia trouble, it was pointed out, was that the strikers are now without funds.

On July 18 President Lewis revoked the charter of District No. 26, embracing the Nova Scotia field. At the same time he removed from office District President Daniel Livingstone, District Vice-President Alexander McIntyre and District Secretary-Treasurer J. B. MacLachlan, and set up a provisional district to function within the jurisdiction of former District 26, under the international union representative, Silby Barrett of Glace Bay.

Lewis instructed union miners in the district to return to work and advised the British Empire Steel Corporation, against which an unauthorized strike has been pending, that the international union has assumed the obligations of the existing joint wage agreement.

The trouble in Nova Scotia started when 8,000 of the 13,000 miners in District 26 two weeks ago went on unauthorized strike to protest the presence of provincial police and militia in the district to watch the property of the British Empire Steel Corporation, Ltd. whose employees are on strike. As soon as he learned of the strike Lewis sent word to his representative to order the men back to work. His orders were ignored.

The miners in the Drumheller coal field of southern Alberta went out on strike on July 13 as a mark of sympathy for the miners in Cape Breton, N. S. High union authority ordered the men back to work until a vote of the whole of the members of the union had been taken, but the men refused to obey the order and still are on strike. The mines have been picketed, but the men operating the pumps are allowed to work.

THE AMERICAN RAILROAD ASSOCIATION has agreed to qualify its recent statement to the effect that there is no shortage of open-top equipment for coal loading. Following the issuance of a statement to that effect, specific instances were cited by the National Coal Association which had been overlooked at the time the statement was prepared.

APPLICATION TO BUILD A 15-MILE BRANCH of railroad to permit of opening of coal mine was made Tuesday by the Okmulgee Northern Ry. Because of the recent action of the I. C. C. denying similar privilege to the Virginian, the applicant presents an argument with the application to the effect that coal could be sold cheaper than that of other mines now served.

Coal Commission Not to Urge Extra Session of Congress; Annual New England Alarm Sets In

John Hays Hammond, chairman of the U. S. Coal Commission, and Commissioner Thomas R. Marshall stated July 22 at Mr. Hammond's home in Gloucester, Mass., that there would be no strike in the anthracite fields next autumn, that the Coal Commission will not urge President Harding to call an extra session of Congress to pass special legislation dealing with the coal situation and that the price of anthracite to New England consumers will not be higher than the prices of the last two years, according to the Boston *Herald.*

Mr. Hammond believes that for the Commission to urge President Harding to call an extra session to deal with the coal situation would be uncalled for and an unwarranted presumption. There is nothing in the present situation which would warrant such action, he said.

"So much publicity has been given the coal industry, cost of labor, margin of profit, wages of labor, etc.," said Chairman Hammond, "that this alone would prove a strong detriment to any such runaway prices as have been named. I do not believe there will be a coal strike.

"The commission has very high hopes," Mr. Marshall said, "that all the former grievances have been forgotten and that the operators and miners realize that operators should receive a decent return on their investment; that the miners should receive a living wage according to the American conception of what that means and that upon that basis there must be uninterrupted operation of the mines to furnish coal to the people of the United States at the cheapest price.

"We have no reason to believe that both operators and miners are not going to reach a conclusion at Atlantic City to keep the mines open and give the people the cheapest possible coal. It is our view that the least interference will promote peace and do the most good.

"If they should lock horns and operations stop, then the commission would seriously take up the question of its duty to lay additional information before the President, not from any party standpoint but from the standpoint of the people of the United States."

The move for a special session of Congress, started by Senator Brookhart, of Iowa, as a plan to deal with the falling price of wheat, was supplemented July 21 by Representative Treadway, of Massachusetts, who said that the same shortage of coal would exist in the New England States next winter as last winter unless Congress acted in a special session on the recommendations of the Coal Commission. Action deferred until the regular session in December, Mr. Treadway said, would be too late.

"I am thoroughly convinced that the only way possible to prevent much suffering next winter is through government supervision of prices and distribution," Mr. Treadway said. "The Coal Fact-Finding Commission's report says that the President in emergencies should take charge of production. I think we should have drastic legislation.

"There is no greater public need than for anthracite coal for domestic use. Electric light rates and distribution are regulated. Water, car lines and freight rates are regulated. There is as great a need for fuel as for any of these public utilities. Consequently, the federal government must step in and see that the people are dealt with fairly by those having the stocks of coal.

"I feel that the subject is so important that whether there is a strike or not, the President should call Congress into special session on his return. I will have legislation drafted ready for consideration as soon as Congress reassembles. I will see the President as soon as possible and lay before him the facts as I find them and urge remedial legislation before cold weather.

Factional Row in District 1 Settled; Brennan Voluntarily Withdraws

William J. Brennan, president of District 1, in abandoning his intention of contesting the election of Rinaldo Cappellini, insurgent leader, who won the district presidency by a plurality of 9,719 votes in the election last month, brought to an end—for the present—the factional fight that threatened to disrupt the biennial convention at Wilkes-Barre last week. Brennan welcomed peace when it was evident that he lacked votes in the convention, Cappellini forces being greatly in the majority.

It was the plan of the Brennan forces to attack Cappellini's election on the floor of the convention, on the ground that under the constitution of the organization he was ineligible to office, Brennan having ousted him as district organizer some months ago. A resolution was prepared and submitted to the resolutions committee July 17 asking that Cappellini be barred from office, but this resolution was withdrawn the next day and the Brennan plan of attack abandoned.

The insurgents forced an issue when Enoch Williams, secretary-treasurer of the district, presented a motion that the convention adopted, making the appeal of Cappellini for reinstatement to the office of district organizer a special order of business. Then the Brennan resolution was withdrawn from committee.

Cappellini asked the 375 delegates assembled to undo that which Brennan did in removing him from office. The appeal easily got a majority of votes and with Cappellini reinstated as a district organizer the last prop was knocked from under the threatened contest of Brennan.

Settlement of the factional row in District 1 means that Rinaldo Cappellini, regarded as the leading agitator among anthracite workers, will sit as a member of the miners' section of the subcommittee negotiating the new wage contract after Aug. 1. Despite his record, however, it is generally understood that Cappellini will uphold Lewis in the present negotiations. The fact that William J. Brennan, former president of District 1, whose friends opposed seating Cappellini, voluntarily withdrew from the content is regarded as supporting the theory that Cappellini will not be a disturbing factor.

Defense in Dock Case Is Now Starting Before Federal Trade Commission

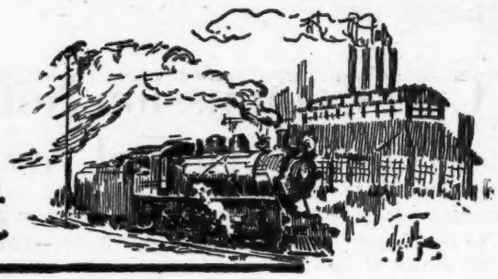
The evidence for the defense is being started in the Minnesota hearings before the Federal Trade Commission in the charges against the dock organization. The prosecution was heard through all of June and a few days of July.

The hearings before the Federal Trade Commission continued up to July 9 with evidence to sustain the charges against the dock association. At that time an adjournment was taken to Duluth to take testimony there. Following, the defense was given a chance to disprove or explain the circumstances of the evidence offered against them. The defense assert that they will be able to show much of the evidence against them to be imagination of a hectic variety.

It is possible that there will be some new orders issued to the coal trade, such as requiring them to sell to municipalities which seek to buy, instead of leaving the business to the local retailer; there may be an opening up of purchasing to anyone with the money to pay for a carload. This would be objectionable to the complaining association, which would wish to maintain the field for the legitimate dealers as much as the dock association might.

At Duluth evidence was taken from dealers and operators of commercial buildings in an effort to establish that dock coal is sold at lower prices in Minneapolis than in Duluth. Dock men attributed the mixed situation in the trade to the southern Illinois mines being able to lay down coal cheaper at Minneapolis than the dock coal owing to the railroad freight rates being in their favor.

Production and the Market



Weekly Review

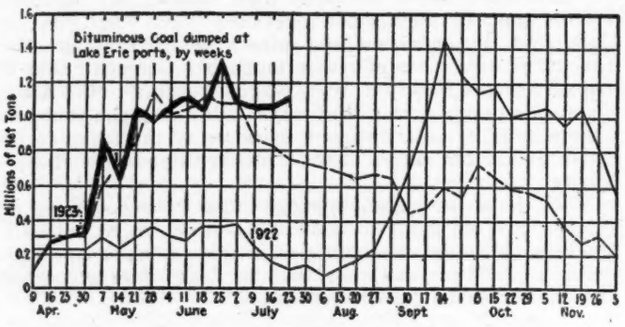
While prices of bituminous coal are hugging the bottom for the season, those for domestic sizes of anthracite quoted by independent producers are getting stronger every day. The pressure on industries and railroads to buy and store soft coal this summer is being relentlessly applied by the Federal Fuel Distributor and the Department of Commerce at Washington. The result is a steady production of soft coal since the first of the year averaging about 10,500,000 tons per week.

Buying has been so quietly conducted and the coal so judiciously selected that the prices on the open market have declined to a level that is now regarded as the bottom. *Coal Age* Index of spot prices of bituminous coal at the mines was 197 on July 23, a drop of one point in one week. The corresponding average price was $2.38 per ton, which is admittedly below the normal average cost of production, although it does not follow that all coal sold at these prices represents a loss to the producer. The higher cost mines that are not protected by contracts have largely ceased production in the summer months. There is very little spot buying at this time, and it is not expected that there will be any activity in the market until late August or early September. Prices of anthracite steam sizes have followed bituminous coal prices downward. The large companies are storing steam sizes and the independents selling well below circular.

Bituminous Market Down; Anthracite Up

In contrast with the sluggish bituminous-coal market is the activity in the domestic sizes of anthracite, where quotations as high as those in the middle of last winter have been reached in the last week in a few instances. Despite the assurance of Chairman Hammond of the Coal Commission to New England consumers, as reported in the press this week, that prices of company coal would rise no higher next winter, there is a remarkably strong undercurrent in the trade and throughout the anthracite region that concessions will be made to the wage demands of the miners, increasing the cost of production and the price to the consumer. Following the slump in production caused by the July 4 holiday, the output of hard coal rose again to over 2,000,000 tons in the second week in July and slightly less than 2,000,000 in the third week.

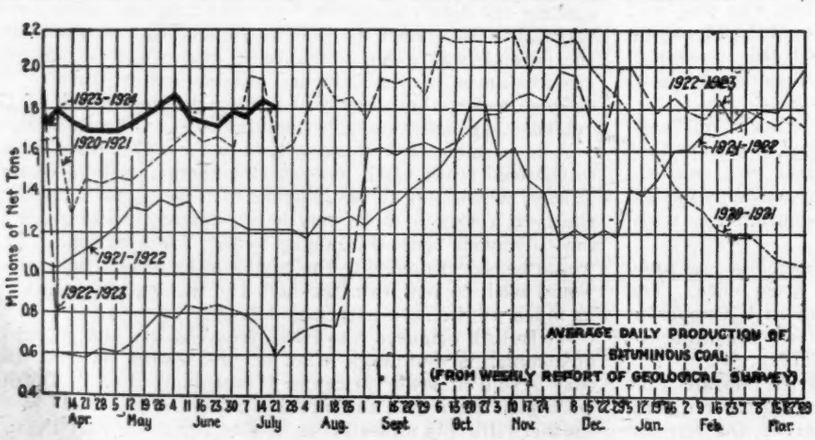
Production of bituminous coal in the first six months of this year was 273,270,000 tons, a figure, according to the Geological Survey, which has been exceeded but once—in 1918—in the past ten years. In the Middle West buying of domestic lump by the retail trade has practically ceased and the market continues its downward trend. Railroads in that territory have about completed their storage program and many industries are buying only as they need the coal. Conditions are dull in New England. Receipts of soft coal are stead-



LAKE COAL DUMPED

(Net Tons)

	Week Ended July 23	Season to July 23
Cargo	1,058,767	12,793,996
Fuel	57,806	637,124
Total	1,116,573	13,431,120



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
June 30	5,226,000	10,458,000
July 7 (b)	3,678,000	8,743,000
July 14 (a)	4,123,000	10,938,000
Daily average	687,000	1,823,000
Calendar year	195,651,000	292,952,000
Daily av. cal. year	1,182,000	1,775,000
ANTHRACITE		
June 30	25,000	2,105,000
July 7	23,000	1,580,000
July 14	32,000	2,051,000
Calendar year	23,380,000	54,800,000
COKE		
July 7 (b)	94,000	377,000
July 14 (a)	100,000	376,000
Calendar year	3,412,000	10,821,000

(a) Subject to revision. (b) Revised from last report.

ily diminishing and there is nothing in the general situation to indicate an improvement for some time. Textile mills are shutting down or curtailing operations and buying no coal. A survey of 1,100 industrial plants throughout New England made early this month showed 300 plants using oil fuel and the remainder with an average of 90 days' reserve coal stored away in their stockpiles.

Producers are not accepting orders at present prices for any except immediate shipments, believing that prices will react upward at the first indication of buying.

Activity in the export market is mostly centered in orders from Italy, Holland and South America. France is out of the market and the flurry of Canadian buying is over. Some English coal is being received but it is on old contracts. Dumpings at Baltimore for the first half of July were 151,377 tons of cargo and bunker coal. During the week ended July 19, 357,979 net tons of coal was dumped at Hampton Roads for all accounts, as compared with 348,130 tons in the previous week.

Chicago Market Softens Further

The general trend of markets in the Middle West continues downward without much relief in any quarter. Enough coal gets into demurrage to spatter distress prices all over the market at Chicago. Good southern Illinois screenings are hard to move at $1.50, especially since a tremendous stock of them, stored since spring, has just been unloaded at $1.15. Central Illinois fines, produced in a little greater volume during the past two weeks than a month ago because a few more mines have reopened, drag at $1.40, and so it goes. There is no demand for domestic sizes and prices range rather crazily from the Franklin County circular of $4.35, which nobody gets, down to $2.75 for certain Williamson County independent lump and egg. On the whole the market is at its soggiest without much hope for improvement for another two weeks at least.

In the Standard field business is unusually quiet. There is practically no demand for anything. Screenings were reported as selling as low as 85@90c. this week, which forced the price of 2-in. lump from $2.25 to $2.40, 6-in. from $2.50 to $2.75, steam egg $2.15 and steam nut $1.85 to $2. Mine-run still continues $1.85. A little railroad coal is moving out, but everything is slow.

In St. Louis business is as nearly dead as it could be.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

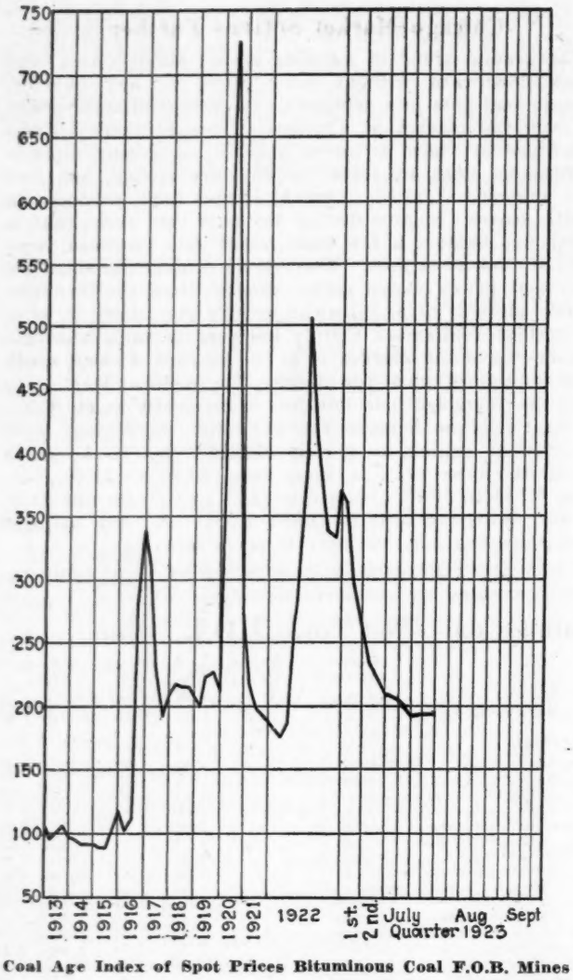
Low-Volatile, Eastern	Market Quoted	July 24 1922	July 9 1923	July 16 1923	July 23 1923†
Smokeless lump	Columbus	$6.00	$5.85	$6.00	$5.75@$6.25
Smokeless mine run	Columbus	6.00	3.25	3.25	3.00@ 3.50
Smokeless screenings	Columbus	5.50	3.10	2.90	2.75@ 3.10
Smokeless lump	Chicago	8.25	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	8.25	3.60	3.60	3.25@ 4.00
Smokeless lump	Cincinnati	5.40	6.00	6.00	6.00
Smokeless mine run	Cincinnati	5.25	3.60	3.35	3.00@ 3.75
Smokeless screenings	Cincinnati	4.90	3.35	3.00	2.50@ 3.50
*Smokeless mine run	Boston	7.65	5.35	5.35	**5.50@ 5.75**
Clearfield mine run	Boston	3.65	2.25	2.35	2.00@ 2.75
Cambria mine run	Boston	4.00	2.85	2.85	2.50@ 3.25
Somerset mine run	Boston	3.75	2.50	2.60	2.25@ 3.00
Pool 1 (Navy Standard)	New York	.....	3.50	3.50	*3.25@ 3.50*
Pool 1 (Navy Standard)	Philadelphia	.....	3.55	3.60	*3.25@ 3.80*
Pool 1 (Navy Standard)	Baltimore	.....	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	.....	2.75	2.55	2.50@ 2.80
Pool 9 (Super.Low Vol.)	Philadelphia	.....	2.70	2.70	*2.35@ 3.00*
Pool 9 (Super. Low Vol.)	Baltimore	4.75	2.60	2.50	*2.35@ 2.50*
Pool 10 (H.Gr.Low Vol.)	New York	8.75	2.35	2.25	2.00@ 2.50
Pool 10 (H.Gr.Low Vol.)	Philadelphia	.....	2.25	2.25	*2.15@ 2.35*
Pool 10 (H.Gr.Low Vol.)	Baltimore	4.75	2.25	2.20	**2.15@ 2.30**
Pool 11 (Low Vol.)	New York	8.25	1.80	1.85	**1.80@ 2.15**
Pool 11 (Low Vol.)	Philadelphia	.....	1.85	1.85	1.75@ 2.00
Pool 11 (Low Vol.)	Baltimore	4.75	2.05	2.05	*1.95@ 2.00*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	8.75	1.65	1.75	1.60@ 1.95
Pool 54-64 (Gas and St.)	Philadelphia	.....	1.55	1.60	**1.60@ 1.85**
Pool 54-64 (Gas and St.)	Baltimore	4.75	1.75	1.75	1.70
Pittsburgh sc'd gas	Pittsburgh	.....	2.40	2.65	2.60@ 2.75
Pittsburgh mine run (St.)	Pittsburgh	.....	1.95	1.95	1.90@ 2.00
Pittsburgh slack (Gas)	Pittsburgh	.....	1.50	1.40	**1.40@ 1.50**
Kanawha lump	Columbus	6.00	3.00	3.00	2.75@ 3.25
Kanawha mine run	Columbus	5.90	1.85	1.85	1.75@ 2.00
Kanawha screenings	Columbus	5.90	1.10	1.10	*1.00@ 1.15*
W. Va. lump	Cincinnati	5.15	3.25	3.10	*2.75@ 3.00*
W.Va. Gas mine run	Cincinnati	5.15	1.75	1.85	*1.25@ 1.75*
W. Va. Steam mine run	Cincinnati	5.25	1.75	1.85	*1. @ 1.75*
W. Va. screenings	Cincinnati	4.75	1.05	1.05	*.85@ 1.25*
Hocking lump	Columbus	5.75	2.75	2.75	2.50@ 3.00
Hocking mine run	Columbus	5.50	1.85	1.85	1.75@ 2.00
Hocking screenings	Columbus	5.50	1.25	1.25	1.20@ 1.35
Pitts. No. 8 lump	Cleveland	7.25	2.55	2.50	**2.15@ 3.00**
Pitts. No. 8 mine run	Cleveland	7.25	1.90	2.00	*1.90@2.00*
Pitts. No. 8 screenings	Cleveland	7.25	1.25	1.30	*1.15@ 1.35*
Midwest					
Franklin, Ill. lump	Chicago	.....	3.90	3.90	*3.00@ 4.35*
Franklin, Ill. mine run	Chicago	.....	3.00	3.00	2.75@ 3.25
Franklin, Ill. screenings	Chicago	.....	1.65	1.65	1.50@ 1.85
Central, Ill. lump	Chicago	.....	2.60	2.60	2.50@ 2.75
Central, Ill. mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	.....	1.35	1.55	*1.40@ 1.50*
Ind. 4th Vein lump	Chicago	.....	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	.....	2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings	Chicago	.....	1.60	1.60	1.50@ 1.75
Ind. 5th Vein lump	Chicago	.....	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	.....	1.45	1.45	1.40@ 1.50
Standard lump	St. Louis	.....	2.35	2.35	**2.40@ 2.75**
Standard mine run	St. Louis	.....	1.85	1.85	1.85
Standard screenings	St. Louis	.....	1.15	1.20	*.85@ 1.00*
West Ky. lump	Louisville	10.25	2.25	2.30	*2.10@ 2.25*
West Ky. mine run	Louisville	10.25	1.65	1.70	1.60@ 1.85
West Ky. screenings	Louisville	10.25	1.15	1.20	*.90@ 1.25*
West Ky. lump	Chicago	11.00	2.40	2.40	*2.00@ 2.25*
West Ky. mine run	Chicago	11.00	1.15	1.15	*.90@ 1.00*
South and Southwest					
Big Seam lump	Birmingham	2.40	3.25	3.25	3.15@ 3.40
Big Seam mine run	Birmingham	2.35	2.05	1.95	1.75@ 2.15
Big Seam (washed)	Birmingham	2.50	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	9.40	3.25	2.85	2.75@ 3.00
S. E. Ky. mine run	Chicago	9.40	2.35	2.10	2.00@ 2.25
S. E. Ky. lump	Louisville	9.25	2.75	2.85	*2.60@ 2.85*
S. E. Ky. mine run	Louisville	9.25	1.85	2.00	*1.50@ 2.00*
S. E. Ky. screenings	Louisville	9.25	1.05	1.05	*.75@ 1.25*
S. E. Ky. lump	Cincinnati	7.00	3.25	3.10	*2.75@ 3.25*
S. E. Ky. mine run	Cincinnati	5.00	1.60	1.85	*1.25@ 1.75*
S. E. Ky. screenings	Cincinnati	4.65	1.05	1.00	*.75@ 1.10*
Kansas lump	Kansas City	5.00	4.00	4.00	3.50@ 4.50
Kansas mine run	Kansas City	4.75	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	4.25	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	July 16, 1923 Independent	July 16, 1923 Company	July 23, 1923† Independent	July 23, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	.....	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.00@ 8.10	.....	7.00@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@12.00	8.00@ 8.35	$8.50@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.06	7.50	8.25	8.50@12.00	7.25@ 7.45	8.50@12.00	7.25@ 7.45
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@12.00	8.00@ 8.35	8.50@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.06	7.75	8.25	8.50@12.00	7.25@ 7.45	8.50@12.00	7.25@ 7.45
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@12.00	8.00@ 8.35	8.50@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.06	7.75	8.25	8.50@12.00	7.25@ 7.45	8.50@12.00	7.25@ 7.45
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.75@ 8.00	6.00@ 6.30	6.75@ 8.00	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.50	6.15@ 6.20	7.00@ 7.50	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.50	5.30@ 5.65	7.00@ 8.50	5.30@ 5.65
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.75@ 3.50	3.50@ 4.15	2.75@ 3.50	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	2.75@ 3.50	3.50	2.75@ 3.50	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	1.80@ 2.50	2.50	1.80@ 2.50	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	1.60	.....	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923			1922
	July 23	July 16	July 9	July 24
Index	197	198	197	460
Weighted average price	$2.38	$2.40	$2.38	$5.57

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

Deliveries of anthracite, smokeless and coke, good until a week ago, have practically stopped. Hot weather has done its worst. Country business around St. Louis, both steam and domestic, is dead.

Kentucky Cuts Prices to Get Business

In western Kentucky prices on prepared sizes are being held quite well though there is some price cutting to get business. This is largely blamed on cancellations, whereas it is actually due to loading coal on prospects, resulting in distress stuff that has to be moved.

Screenings, which had been expected to improve, have worked lower, and are now coming into competition with some good grade of eastern Kentucky screenings, which are quoted by jobbers to industrial consumers on the Louisville market at 75c. f.o.b. mines. Western Kentucky is asking 90c., as a lower freight rate to Louisville gives that field an advantage.

More than half of Kentucky's mines are down. Many dealers and others who stocked regret it now because of prevailing low prices today. Operators blame dealers for trying to take too wide a margin, while letting producers be charged with causing high coal prices. Quotations on domestic eastern Kentucky average $8 and on Western Kentucky $7.

Northwest Takes Anthracite

Anthracite movement from Duluth and Superior docks has been improving because of strike talk. Current quotations are as follows: Egg, $12.50; stove, $12.80; nut, $12.85; pea, $11, and buckwheat, $8.50. The Duluth market in bituminous is slow with prices steady, as follows: Youghiogheny and Hocking lump, $6.50; run-of-pile, $5.50; screenings, $4, with some docks quoting screenings carried over from last season at $3.85. Split lump or stove is $7.50; run-of-pile, $6.50; screenings, $4.50; Kentucky lump, $8.50; run-of-pile, $7.25, and screenings, $5.25; Elkhorn lump or egg, $9; run-of-pile $7.50; screenings $5.75; Pocahontas, lump or stove, $10; mine-run, $7.50, and screenings, $6.50.

The Milwaukee coal market is stagnant. City dealers are having a smattering of trade, but jobbers say business is dead in the country. Everybody thinks there will be plenty of coal the coming winter, and it is this feeling that checks the demand.

Western Business Is Flat

Western markets show no life whatever. In the Kansas and Oklahoma regions there is no demand for anything and "no-bills" at the Kansas mines run over 200 cars steadily. Summer storage price offers have been almost futile all the way from Kansas City to Salt Lake City, where they were supposed to have been cancelled July 1 but were not because of poor business at any price. In Utah they are already talking of a coming car shortage.

No Interest Seen in Ohio Markets

Buying is at a low point in the Columbus market, as neither steam users nor retail dealers are disposed to stock up. Buying for present needs seem to be the general rule. Railroads are taking the usual percentage while some buying by utilities is reported. Considerable distress coal is reported on the market which is being let go at low prices. The Southern Ohio Coal Exchange reports production of 123,000 tons from 442 mines in the Southern Ohio field during the week ended July 7. There is plenty of coal in the Cincinnati market, but there is a lack of interest in offerings. Some sales are being made of all rail coal to the Northwest. West Virginia 2-in. lump is quoted at $2.25@$2.50 as compared with $2.50@$3 last week and southeastern Kentucky 2-in. lump at $2.25@$2.50 as compared with $2.50@$3 last week. Steam demand at Cleveland continues quiet while retail dealers are confined pretty much to smokeless fuels and anthracite. As a result of railroad fuel inquiries in northern and southern West Virginia many producers are inclined to believe that heavier railroad-fuel buying will stimulate business a little later in the season. Production in Virginia is keeping up well, ranging around 60 per cent of capacity.

The market at Pittsburgh seems to have recovered from the depressing influence caused recently by curtailment of puchases of byproduct steam and gas coal, particularly the last named, by the steel mills. The mills are running at a lower rate than formerly and are producing only for immediate or very early requirements. The situation at Buffalo continues quiet. There is no buying. For the week ended July 15 loadings in the central Pennsylvania district were 18,700 cars, as compared with 15,503 cars the previous week. During the first six months of 1923 production in central Pennsylvania was 26,075,675 tons.

New England in Grip of Doldrums

In New England the market is still in the doldrums. Both all-rail and by water receipts are steadily diminishing and the general industrial situation is not favorable to any increased demand during the next month or so. The textile mills in particular are suffering from the light market for finished goods and throughout the territory shutdowns and curtailments are the rule. The effect upon steam coal is depressing, and spot sales are few and only for small tonnages.

For distribution inland from ports like Providence, Boston and Portland there is only scattering inquiry and except for occasional "market cargoes" prices are around

$7 per gross ton on cars. There have been part cargo-lots forced on the market at a considerably less figure. The Hampton Roads factors continue to dominate areas adjacent to tidewater to the extent that they get what business is offering, but the aggregate tonnage is small.

Navy standard grades of Pocahontas and New River are being held more or less firmly at Hampton Roads, the current range of price being $5.50@$5.75 per gross ton f.o.b. vessel. Dumpings are confined, however, for the most part to deliveries on contract, almost no coal having changed hands recently on spot business.

In central Pennsylvania the situation varies very little. A few of the more favorably known coals have been enjoying fair business, especially on long-term contracts, but the great bulk of Clearfields and Cambrias find it hard going. The extra tonnage that accrued to central Pennsylvania while Hampton Roads prices were at $6.75@$7 is now rapidly falling off and July figures will show a marked contrast with those of May. In all directions steam coal seems to be a drug on the market with slight prospect of improvement in the near future.

Only Bargain Hunters in New York Market

The New York tidewater market is dull. Shipments are not heavy and quotations remain on about last week's basis. Consumers are not taking in heavy tonnages but are picking up bargain lots at low prices. There is a slight change for the better in the Philadelphia tidewater market, but it seems to be only temporary. The Baltimore trade feels as if better conditions are almost at hand. There have been inquiries from large concerns as to autumn and winter needs. Trade at Birmingham is slow and consumers are showing little interest. Several thousand tons of coal are being loaded at Mobile for West Indian points. Domestic buying is fairly active for high-grade coals.

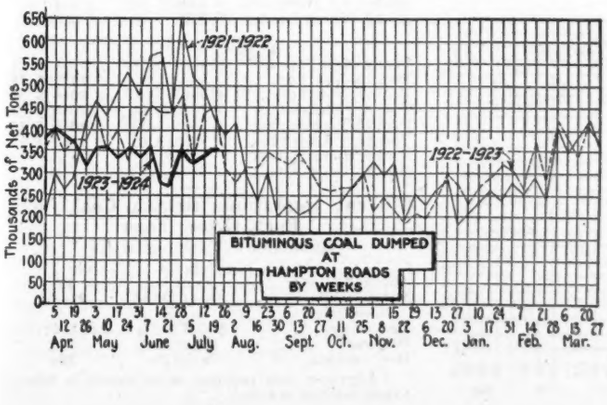
Lake Movement Continues Apace

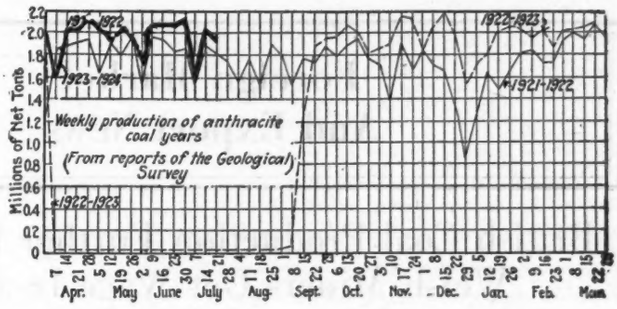
Better lake movement is expected at Columbus during August than is now being had. Demand for lake coal at Pittsburgh has improved, while 138,100 net tons of anthracite were shipped from Buffalo last week, of which 77,000 tons cleared for Duluth and Superior, 15,000 tons for Chicago, 33,300 tons for Milwaukee and 12,800 tons for Fort William. More hard coal has been received at Milwaukee so far this season than was received during the entire season last year.

Demand for Domestic Anthracite Mounts

Demand for anthracite domestic coals has increased considerably. Retail dealers seem to be receiving larger shipments, which are being delivered to consumers as rapidly as possible. Chestnut coal, next to pea size, is the easiest of the larger coals. Strong demand and lack of coals feature the Philadelphia market. Consumers in all sections are being urged to lay in their supply of coal, which only adds to the pressure already placed on the dealers. Movement of hard coal to Baltimore so far this month has been a disappointment to the trade there. Retail dealers have orders on their books far in excess of receipts so far.

"In the pick-up after the holiday anthracite production passed the two-million ton mark in the week ended July 14," says the Geological Survey. "On the basis of 39,221 cars reported loaded by the nine principal anthracite


Thousands of Net Tons
1921-1922
1922-1923
1923-1924
BITUMINOUS COAL DUMPED AT HAMPTON ROADS BY WEEKS
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.


Millions of Net Tons
1921-1922
1922-1923
1923-1924
Weekly production of anthracite coal years
(From reports of the Geological Survey)
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.

carriers, the total production, including mine fuel, local sales and the output of washeries and dredges, is estimated at 2,051,000 tons. Early returns for the week July 16-21 indicate a lower rate of output and a probable yield of about 1,900,000 tons."

BIDS FOR FURNISHING AND DELIVERING COAL to the various camps, arsenals, forts and buildings under the jurisdiction of the U. S. Army along the Atlantic seaboard as far south as Virginia are being received by the Quartermaster's Department, Brooklyn. The total amount required is 86,061 net tons of anthracite, 52,453 net tons bituminous and 355 net tons of coke. The bids have been divided into three parts. The first part, covering the New England States and Forts Michie, Terry and Wright, in New York State, was opened July 25 and called for 12,391 net tons of egg coal, 5,439 tons stove coal, 4,348 tons chestnut coal, 5,435 tons bituminous mine-run and 450 tons bituminous 2-in. lump coal. The second part will be opened on July 31 and covers New York, New Jersey and Delaware. On Aug. 6 the third batch of bids will be opened for camps and other army buildings in Pennsylvania, Maryland and Virginia. Deliveries on all contracts are to run until June 30, 1924, although in most cases the entire tonnage will be called for by Sept. 1 of this year.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to June 30, 1923 Inclusive	Week Ended July 7, 1923
U. S. Total	55.7	....	....	....
Somerset County	74.9	36.3	42.5	71.2
Panhandle, W. Va.	51.3	57.3	59.1	52.3
Westmoreland	58.8	65.8	60.5	67.0
Virginia	59.9	55.7	59.3	57.8
Harlan	54.8	22.1	24.4	(a)
Hazard	58.4	16.4	28.8	53.4
Pocahontas	60.0	36.6	41.9	72.9
Tug River	63.7	28.8	40.1	59.7
Logan	61.1	26.2	33.2	46.5
Cumberland-Piedmont	50.6	31.7	53.4	41.5
Winding Gulf	64.3	30.4	37.6	31.4
Kenova-Thacker	54.3	42.4	38.3	45.3
N. E. Kentucky	47.7	28.4	32.2	36.1
New River	37.9	31.6	34.9	43.4
Oklahoma	59.6	59.1	68.6	52.4
Iowa	78.4	75.9	46.9	49.5
Ohio, Eastern	46.6	40.8	45.1	69.8
Missouri	66.8	76.3	67.8	77.4
Illinois	54.5	49.9	41.0	33.0
Kansas	54.9	55.9	48.1	43.1
Indiana	53.8	37.7	45.7	41.4
Pittsburgh†	39.8	41.2	45.2	69.5
Central Pennsylvania	50.2	53.4	52.9	57.4
Fairmont	44.0	35.5	46.7	67.9
Western Kentucky	37.7	32.4	31.2	34.2
Pittsburgh*	31.9	56.1	69.1	92.2
Kanawha	13.0	15.6	26.2	36.9
Ohio, Southern	24.3	38.1	30.0	21.7

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded — All Cars	Coal Cars
Week ended July 7, 1923	854,748	160,218
Previous week	1,021,770	185,757
Same week in 1922	707,025	70,860

	Surplus Cars — All Cars	Coal Cars	Car Shortage	
July 7, 1923	64,067	4,620	.....	.....
Same date in 1922	239,160	146,743	.....	.....
June 30, 1923	63,636	3,896	.....	.....

Foreign Market And Export News

British Coal Production Further Declines; Welsh Miners Get Wage Increase

Another decline in Great Britain's coal output was recorded during the week ended July 7 when production was reported at 5,306,000 tons, says a cable to *Coal Age*. This was a decline of 95,000 tons when compared with the previous week.

The Welsh coal market is steadier. Following a good deal of contract activity, the mines have become better booked up, and the tone is firmer. Market conditions have encouraged buyers to come forward more freely, and business with France, South America, and the Continent is showing a steady improvement.

Welsh miners have received a wage raise of 9.62 per cent, making the wage-rate 37.62 per cent over the standard of 1915. For a year and a half now the wage-rate has been on the minimum of 28 per cent above the standard.

The Newcastle market is much firmer. Germany is inquiring on a large scale. The demand from other European countries with the exception of Italy is increasing.

German Coal Situation

The marked reverse which the coal market in the German interior suffered, starting at the first days of April, equally affecting domestic and imported coal has given place to a brisker tone. This reverse was caused partly by the business slump, which greatly reduced industrial activity and by expectations of a near end of the Ruhr blockade. Revival of business on the one hand and the growing conviction on the other, that no political change can be expected in the near future has again stimulated the demand with the result that lively business on the import market is being looked for.

The tendency is getting stronger not to rely on Great Britain alone but extend the import business to other markets if only as a stabilizing factor. The shipments so far obtained from the United States have, as far as can be heard, given full satisfaction as regards quality, which has been greatly instrumental to wiping out the prejudice against American coal, caused by previous experiences. It is therefore more than likely that the chief coal importers will in the future exhibit an increased activity on the American market.

Export Clearances, Week Ended July 21, 1923.

FROM BALTIMORE

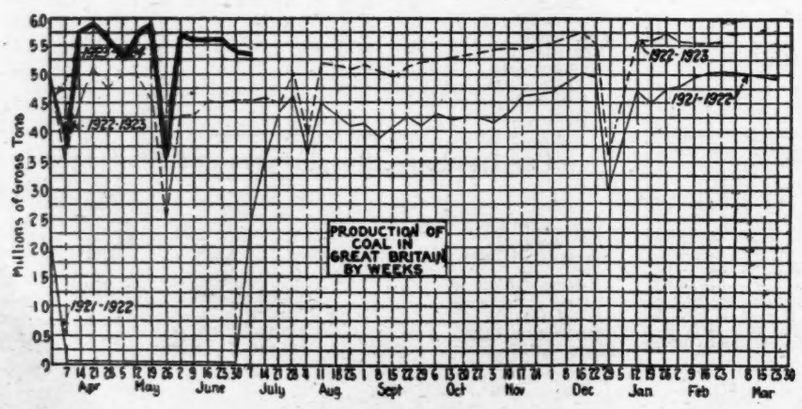
	Tons
For Canada:	
Br. SS. Twickenham	7,964
Br. SS. Rose Castle	10,842
For France:	
Br. SS. Kumeric	10,858
Span. SS. Aratza Mendi	5,618
For Germany:	
Br. SS. Wentworth	8,178
For Holland:	
Ital. SS. Iris	9,228
Nor. SS. Strinda	10,732
For Italy:	
Ital. SS. Tuscola	6,745
For Sweden:	
Swed. SS. Narvik	7,328

FROM HAMPTON ROADS

For Brazil:	
Br. SS. Baron Napier, for Buenos Aires	6,295
Br. SS. Norwich City, for Rio de Janeiro	7,185
Br. SS. Lady Kathleen, for Rio de Janeiro	5,066
Braz. SS. Mandu, for Rio de Janeiro.	7,142
For Canada:	
Nor. SS. Marshall, for Bathurst	3,004
Br. SS. Sheaf Mount, for Montreal	8,068
Dan. SS. Phoenix, for St. Thomas	3,223
Br. SS. Black Heath, for Sydney, N. S.	7,667
For Cuba:	
Nor. SS. Hundvaago, for Cienfuegos.	2,965
Ger. SS. Luise Hernsoth, for Havana	8,458
Nor. SS. Elida Clausen, for Havana	3,450
For Hawaii:	
Amer. SS. Orleans, for Pearl Harbor.	9,051
For Holland:	
Du. SS. Flensburg, for Rotterdam	10,062
Grk. SS. Meropi, for Rotterdam	6,068
For Italy:	
Ital. SS. Alatrium, for Porto Ferrajo.	5,923
For West Indies:	
Amer. SS. Mendora, for Kingston	2,570
Amer. Schr. Edwin G. Farrar, for St. Georges	787

FROM PHILADELPHIA

For Cuba:	
Nor. SS. Almora, for Havana	...
Nor. SS. Swartfond, for Havana	...
For France:	
Br. SS. Skipsea, for Marseilles	...
For Italy:	
Ital. Bark Providence, for Genoa	...



Demand at Hampton Roads Quiet

Demand for coal fell to a minimum at Hampton Roads last week, following a brief revival in trade during the week before. Foreign shipments were brisk, but largely on old contracts which are rapidly being completed.

Large shipments to Canada, which were forecast, did not materialize to any great extent. Coastwise trade was very dull, with bunkers only moderately active.

French Coal May Imports

French imports of coal in May and during the first five months of 1923, according to French Customs returns, follow, in metric tons:

Coal:	May	Jan.-May
Sarre	52,386	552,960
Great Britain	1,706,192	7,367,581
Belgium	196,157	980,427
U. S.	102,235	121,015
Germany	84,599	502,322
Spain	20	3,340
Netherlands	45,980	253,629
Czecho-Slovakia	19	4,321
Other countries	5,743	6,250
Totals	2,193,331	9,791,845

United States June Domestic Coal Exports

(In Gross Tons)

Coal	1922	1923
Anthracite	40,284	418,594
Value	$354,443	$4,504,939
Bituminous	540,550	2,418,769
Value	$2,903,175	$12,653,967
Coke	29,090	63,841
Value	$258,902	$680,325

Twelve Months ended June

Coal	1922	1923
Anthracite	2,992,385	3,733,714
Value	$32,201,158	$40,691,885
Bituminous	13,035,800	15,953,379
Value	$67,915,106	$97,523,225
Coke	297,431	964,878
Value	$2,607,161	$10,645,522

Hampton Roads Pier Activities

	July 12	July 19
N. & W. piers, Lamberts Pt.:		
Cars on hand	1,346	1,370
Tons on hand	93,069	74,662
Tons dumped for week	109,522	133,344
Tonnage waiting	.....	19,000
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,917	1,846
Tons on hand	108,120	106,400
Tons dumped for week	108,100	101,443
Tonnage waiting	13,390	3,568
C. & O. piers, Newport News:		
Cars on hand	1,060	1,160
Tons on hand	53,875	60,485
Tons dumped for week	93,208	84,837
Tonnage waiting	9,100	23,340

Pier and Bunker Prices, Gross Tons

PIERS

	July 14	July 21†
Pool 9, New York	$5.50@$6.00	*$5.35@$5.85*
Pool 10, New York	5.00@ 5.35	**5.00@ 5.40**
Pool 11, New York	4.30@ 5.00	**4.50@ 5.00**
Pool 9, Philadelphia	5.30@ 5.75	*5.25@ 5.75*
Pool 10, Philadelphia	4.45@ 5.25	4.45@ 5.25
Pool 11, Philadelphia	3.75@ 4.35	*3.70@ 4.35*
Pool 1, Hamp. Roads	5.75	*5.50*
Pools 5-6-7, Hamp. Rds.	4.85@ 5.00	*4.50*
Pool 2, Hamp. Roads	5.25@ 5.50	*5.25*

BUNKERS

Pool 9, New York	5.80@ 6.30	*5.65@ 6.15*
Pool 10, New York	5.30@ 5.65	**5.30@ 5.70**
Pool 11, New York	4.60@ 5.30	**4.80@ 5.30**
Pool 9, Philadelphia	5.70@ 6.00	5.70@ 6.00
Pool 10, Philadelphia	4.75@ 5.55	**4.80@ 5.60**
Pool 11, Philadelphia	3.90@ 4.65	3.90@ 4.65
Pool 1, Hamp. Roads	5.75	*5.50*
Pool 2, Hamp. Roads	5.25@ 5.50	*5.25*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	July 14	July 21†
Admiralty, large	30s.@31s.	**31s.**
Steam smalls	18s.@22s.6d.	**21s.6d.**
Newcastle:		
Best steams	26s.6d.@27s.	*26s.@26s.6d.*
Best gas	28s.@30s.	*28s.*
Best bunkers	26s.@29s.	**28s.**

† Advances over previous week shown in heavy type, declines in *italics*.

News Items From Field and Trade

ALABAMA

Officers and directors of the DeBardeleben Coal Corporation, recently formed by the merger of the Corona Coal Co., DeBardeleben Coal Co., and Empire Coal Co., have been announced as follows: Henry T. DeBardeleben, president; Walter Moore, vice-president; Milton Fies, operating vice-president; G. M. Bowers, secretary-treasurer. The above officers with the following additions form the board of directors: W. F. Hull, New York; Morris Adler, Eugene Fies, Julien Adler, W. W. Gradford, Birmingham; T. Johnson Ward, Henry Vaughan, Harry Townsend, Philadelphia. The DeBardeleben corporation assumes all the contracts of the merged companies. The new company will give special attention to bunker and export trade at Southern ports, where ample facilities are provided for the storage of coal and bunkering of ships with dispatch. The Birmingham offices of the company will be located on the tenth floor of First National Bank Building in quarters formerly used by the Corona Coal Co.

Alabama produced more coal during the first six months of 1923 than during any similar period for the past five years, according to figures compiled by the Alabama Mining Institute from weekly reports received by that organization. The total for the half year was 9,737,000 net tons, which exceeds the 1922 output by 17 per cent and that for 1921 by 52 per cent for the same period. March was the banner month, with an output of 1,842,000 tons, and also held the weekly record of 416,000 tons March 31. Production for the year is on a basis of 19,473,000 tons. The above figures are conservative, a number of small operations not making weekly reports to the Institute regularly, if at all.

ILLINOIS

The Mt. Olove & Staunton Coal Co., Staunton, has inaugurated the plan of **paying by check instead of cash,** following the hold-up in Staunton recently, when $45,000 of the company's payroll money was stolen. Checks will be drawn on the Staunton National Bank.

James Miller, who is sinking a shaft on the Orville Taylor farm in the Sangamon valley, near Springfield, has struck a 3-ft vein of coal at a depth of 39 ft.

The old Citizens Mine A, near Springfield, will be taken over by the Central Illinois Coal & Mining Company, a new organization. The mine is located four miles west of Springfield on the C. P. & St. L. R.R. and has been closed down for the past two years. It is expected that 150 men will be employed. The opening of this mine will place in operation all of the fourteen mines in the Springfield switching district and will bring the total capacity of the mines around Springfield to 23,000 tons. F. J. Devlin is mine manager for the new company. James P. Hickey and W. M. Ryan are officials.

The Globe Coal Co., has increased its capital stock from $1,000,000 to $3,000,000.

The Abbott Coal Mining Co., of Pekin, has been incorporated for $10,000 by L. C. and C. J. Abbott, H. C. Gulen, Frank Keays and J. R. Cunningham to sink a shaft and operate a mine.

Plans have been completed and according to reliable information work will be started within the next few days on the sinking of **a new coal mine two miles north of Hurst,** just across the Jackson County line in Williamson County. The Western Coal & Mining Co. with headquarters in Murphysboro will sink the shaft. According to present plans the mine will be one of the largest in the vicinity and will be known as mine No. 3, the company operating one under the name of mine No. 2 at present. In order to provide homes for miners at the new mine the company is planning to erect 150 houses on company property near the new shaft. Approximately 600 men are working at Mine No. 2 and this new mine is expected to employ as many or more when in full operation.

Mine No. 5 of the Southern Gem Coal Corporation at Pinckneyville has been shut down indefinitely by officials of that company. The orders scheduled for the mine probably will be taken care of from Mine No. 6 of that company. Prior to the shutdown the men working at the shaft had been on a "wildcat strike" over the first engineer of the mine. The men claimed the engineer was incompetent and demanded his discharge. However, the company did not grant the demands.

The Pontiac Coal Mining Co., of Pontiac, has been incorporated with capital of $50,000 to operate coal mines. The incorporators are C. J. Fromgen, H. H. Webb and C. M. Webb.

The Phillis & Benson Coal Mining Co., has sunk another shaft, reaching a 5-ft. vein of coal. Mining is expected to begin about Aug. 1.

The Taylor mine near O'Fallon has been forced into further idleness since having been shutdown for some time during which the main shaft was repaired. When men went inside the mine to clean up and make ready for operating, they found fire in the workings. No cause has been assigned for the fire though shots fired before the shutdown may have started the blaze.

The Shed Coal Co., Marion Ill., has been incorporated with capital of $100,000 by E. E. Allen, P. H. Williams, and H. J. Faust.

INDIANA

More than 20,000 people were said to have witnessed the **Indiana State first aid meet** at Sullivan, July 7. It was the largest event of its kind in the state's history. **The team from Miami Coal Co.'s No. 10 mine won first place** in the contest and will go to the International First-Aid Meet in Salt Lake City, Utah. Aug. 27-29, representing the United Mine Workers of Indiana. Its average was 99⅓ per cent. The team from Jackson Hill No. 4 mine won second place with a score of 99⅓ per cent, and will go to Salt Lake City representing the Indiana Bituminous Coal Operators' Association. The scores of other competing teams at Sullivan follow: Jackson Hill mine, West Terre Haute, 98⅔; Peerless mine, Sullivan, 98⅔; Miami mine, Clinton, 98¼; Jackson Hill mine No. 7, Shelburn, 98; Vandalia mine, Sullivan, 97.8⅔; Clinton mine, Clinton, 97.6⅓; Glendora Mine, Vincennes, 97⅓; J. K. Dering mine, Clinton, 97⅓; Pan Handle mine, Blacknell, 96.8⅔; Miami mine No. 8, Clinton, 96⅓; Knox Consolidated mine No. 3, Bicknell, 96⅓; Knox Consolidated mine No. 2, Bicknell, 96.3⅔; Vigo mine, Sullivan, 96.3⅔; Vermillion mine, Clinton, 96¼; Vandalia mine, Linton, 96¼; Howe-Coulter mine, Bicknell, 95⅔; Knox Consolidated mine No. 4, 95¼; Knox Consolidated mine, 95¼; Knox Consolidated mine No. 1, team No. 2, 95⅓; Vandalia mine No. 23, Sullivan, 95; Carlisle mine, Carlisle, 94.8⅔; Knox Consolidated mine No. 1, team No. 1, 94⅔; Vandalia mine No. 12, Sullivan, 94⅓; Templeton mine, Sullivan, 94.1⅓.

Seventy-five men were thrown out of work when **the tipple, machinery, surrounding buildings and two coal cars of the mine owned by the Sherwood Coal Co.,** of Illinois, ten miles west of Linton, burned. The loss, which was partly covered by insurance, may reach $75,000. It was a spectacular fire and drew thousands of spectators. Little was saved from the burning structure. Officials of the company said that new surface buildings and machinery would be built at once.

KENTUCKY

The Golden Decker Coal Co., of Barbourville, has filed amended articles, increasing capital stock from $10,000 to $50,000.

The White Coal Co., an operating organization of Whick, in Breathitt County has been chartered by M. G. Yingling, J. R. White and Charles Byrd.

It is reported from eastern Kentucky that the **Kentucky & West Virginia Power Co. will extend its line to Logan, W. Va.,** in the coal fields, and from there connection will be made to **Charleston, where** 50,000 people are now being served by the parent company, the American Gas & Electric Co. From Charleston it is planned to extend to the manufacturing town of Wheeling. The company after a few short years' operation in eastern Kentucky is supplying current to several towns and a large number of operators in the Elkhorn-Hazard fields.

The Inland Waterways Co., of Louisville, which controls mines on the Kentucky River and river equipment for transporting coal, oil, etc., **has started work on combination rail and river terminals at Jeffersonville, Ind.,** across the river from Louisville, where property is being cleared for that purpose. The company is also starting erection of terminals at Louisville, where temporary equipment has been in use.

The Standard Oil Co., of Kentucky, which has a large underwater or submergible concrete storage pit at its Riverside Refinery, Louisville, this spring enlarged the capacity of the pit to 400 cars, and reports that the pit is now fully stocked.

C. F. Richardson, of the West Kentucky Coal Co., Sturgis, Ky., **is one of the incorporators of the Bank of Sturgis,** capitalized at $15,000.

V. M. Lackey, secretary-treasurer of the Dixie Fuel Co., jobbers, and the Phoenix Coal Mining Co. and Douglas Coal Mining Co., Louisville, will be married on July 31, at Nashville, Tenn., to Miss Mildred Adel Harrington, of that city.

Records of cars furnished in western Kentucky for July to date show that the **Illinois Central R.R. has a surplus, with 118.2 per cent reported.** The Louisville & Nashville R.R. showed 68.2 per cent on its Owensboro division and 98 per cent on its Henderson division. Eastern Kentucky mines are getting all the cars needed, due to lack of demand, light loading and the fact that many mines are down.

M. M. Kling, head of the Louisville Coal & Coke Co., Louisville, who left the city a few months ago to make his home in Oakland, Cal., **has sold his interest to his partner, R. C. Eyl,** who has been in active charge, and to John L. Sullivan and J. L. Timmel. Eyl becomes president and treasurer, while Sullivan is vice-president; and Timmel is secretary and sales manager. Yard and offices are located at Clay and Fulton streets, with a sales office at 718 East Market street.

It is reported that J. W. Reedy and associates have arranged for a new coal development on Carrs Fork, in Knott County, near Whitesburg, where the Louisville & Nashville R.R. is said to be planning an extension of its lines.

From Hartford, on July 14, it was reported that **Opal Wells,** 19 years of age, **son of Charles W. Wells, coal operator** and former Mayor of Central City, **was shot and killed** by Charles W. Scroggins, garage mechanic, following an argument concerning the right of Scroggins to pass Wells on the road at a narrow point.

MINNESOTA

The State Railroad and Warehouse Commission has issued a circular urging all consumers to buy coal early, to avert a congestion in the fall and winter.

The Reeves Coal & Dock Co., Minneapolis, has contracted with the Haynes Coal Co., Haynes, N. D., to take the entire output of its lignite mines for five years, with a minimum annual production of 100,000 tons.

The Inland Coal & Dock Co. has let a contract for an addition of 500 ft. to its dock at Duluth to R. C. Buck, Inc., of Superior. With this addition the dock will be 3,500 ft. long and 350 ft. wide, and will afford a bituminous storage capacity of 700,000 tons. The extension will be of concrete and its cost will be $80,000. It is expected to be completed by early next October.

The City of Two Harbors has placed an order for 5,000 tons of Youghiogheny coal for the use of its municipal coal yard with the Valley Camp Coal Co. at $5.54 a ton. It is understood that the city's price to consumers will be $10 a ton.

Receipts of coal at the head of the Lakes docks were in good volume during June. Unloading of bituminous were reported at 1,849,400 tons and of anthracite of 224,300 tons. That brought receipts since the opening of the navigation season to June 30 up to 3,480,800 tons of bituminous and 431,900 tons of anthracite. During the same period in 1922, owing to the miners' strike, anthracite receipts were only 5,000 tons and bituminous 286,600 tons.

MISSOURI

Pierre Quinn has surveyed a coal mine on the Choriton lease near Columbia and will open another shaft east of the present one. The present shaft is about 40 ft. deep and the new shaft is to be opened about 1,100 ft. east of it.

John A. Sargent was appointed general manager of the coal department of the Central Coal & Coke Co., Kansas City, July 18, succeeding to the job vacated several months ago by the resignation of Harry N. Taylor to become president of the United States Distributing Co. Mr. Sargent was general sales manager and traffic manager of the Central, and since the resignation of Mr. Taylor had been handling much of the work of the general manager's office as well. Before going to the Central in 1902 Mr. Sargent was in railroad work. No successor to Mr. Sargent in either the sales or the traffic department of the company has been named. It has been announced that he will continue in direct supervision of those departments.

NEW YORK

The Cortright Coal Co., of Philadelphia, has established offices in New York City, with W. J. Borden, who is well known to the local trade, in charge. The company is located on the eighth floor of 1 Broadway.

Dividends declared and awaiting payment, as reported currently in *The Annalist*, include the following coal companies:

Company	Rate	Period	Payable	Books Close
Burns Bros. A.....	$2.50	Q	Aug.15	Aug. 1
Burns Bros. B.....	50c.	Q	Aug.15	Aug. 1
Burns Bros. pr. pf....	1%	O	Aug.15	Aug. 1
C. Wilm. & F. Coal pf.	1¼	Q	Aug. 1	July 16
Dominion Coal pf....	1¾	Q	Aug. 1	July 12
Hillman C. & C. Co., 5% pf.....	1¼	Q	July 25	July 14
Hillman C. & C. Co., 7% pf.....	1¾	Q	July 25	July 14
Ind.& Ill.Coal Corp.pf.	3½	..	July 16	July 9

OHIO

The Carroll Coal Co., Cleveland, has been incorporated with a capital of $100,000 to mine and sell coal. The incorporators are Louis G. Carroll, John L. Dowling, Edward L. Brady, Frances H. Devlyn and Richard J. Moriarty.

Quite a few operating companies have been chartered in Ohio recently, showing some development work going forward in various Ohio producing fields. Among the number was the **Old Minglewood Coal Co.**, of Massillon, with an authorized capital of $20,000 to operate in the Coshocton field. Perry A. Keun, William H. Snyder, A. W. Erickson, Charles Beiner and A. W. Inman are the incorporators.

OKLAHOMA

The Rock Creek Coal Mine Co., of Panama, has let the contract to the Oklahoma Gas & Electric Co. to electrify its mine located on the Bedwell No. 2 lease, installing pumps, fans and coal cutters.

PENNSYLVANIA

Reports from the annual sales convention of the **International Fuel & Iron Corp.**, of Pittsburgh, June 1 and 2, show the biggest business year to date in the history of the company. The convention was attended by twenty-two representatives of district and local sales offices throughout the country who came to Pittsburgh for an informal meeting to discuss present and future problems of the company and of coal industry. The company announced that May tonnage was the largest in the history of the company, and that June bookings indicate another record month. Officials state that the company's bookings for the year will be over two and a half million tons of their own coal and about an equal tonnage from outside sources.

The Pittsburgh Testing Laboratory announces the appointment of F. H. Rood as engineer of tests with headquarters at Pittsburgh. Mr. Rood is a civil engineer, graduate of Syracuse University. For many years he was engineer of tests for the New York State Highway Commission; for three years was assistant engineer of tests, Pittsburgh Testing Laboratory and for two years a research engineer with the U. S. Bureau of Public Roads.

One hundred and fifty employees of the **Bertha-Consumers Company**, including all branch sales managers and mine superintendents, met with the Pittsburgh office personnel **at a company luncheon** July 7 in the Fort Pitt Hotel. W. L. Stewart, chairman of the board of directors, was toastmaster and the principal address was made by John H. Jones, president of the Bertha-Consumers Company. Other speakers included W. M. Furey, a stockholder of the company and former president of the Chamber of Commerce, and Captain M. Steidle of the mining department of Carnegie Institute of Technology, as well as a number of the staff of the Bertha-Consumers Company.

Four bills relating to mine laws of the state were vetoed by Governor Pinchot on July 14. All were sponsored by Senator Joseph O. Clark, Indiana County. The veto messages were similar in that all of them stated that the bills were unnecessary.

Fifty men from the mines enrolled in the five weeks' summer course in coal mining at State College. Two are operators, two are coal salesmen and the rest are miners and officials, mostly from the Pennsylvania bituminous regions. Several of the younger men are seriously considering a four-year course at State College.

F. A. Coffroth, a son of E. B. Coffroth, Somerset, has been named as superintendent of the Briar Hill Coal & Coke Co., in Fayette County. He has been associated with the Briar Hill company in various capacities for many years.

The fourth annual first-aid contest of the Bertha-Consumers Co., Pittsburgh, will be held on the grounds of the Pittsburgh Station, U. S. Bureau of Mines, at 2 p.m., Aug. 11. The fourteen competing teams will represent the company's mines in Pennsylvania, West Virginia, Ohio and Kentucky.

After being idle two days, **eight hundred miners resumed work July 13** at Maxwell No. 20 colliery of the Lehigh & Wilkes-Barre Coal Co. Their strike was settled at a meeting held by the local union. The men passed their grievance on to a committee of mine workers, who will confer with company officials.

P. J. Moore, mine inspector of the Second Inspection District, with headquarters at Carbondale, in his report for 1922 says **1,956,624 tons of coal was produced** and that 7,883 men and boys are employed in and about the mines in that district. Of the coal produced 1,784,323 tons was shipped. There were 82,300 tons of coal produced by electrical machines. Nine fatal accidents occurred inside the mines during the year, and one outside. There are 35 mines, including strippings, in the district, and during the year two new mines were opened and two old mines abandoned.

The Scranton and the Wilkes-Barre mine-cave situation made no progress this year so far as legislation is concerned. While the Legislature, which two years ago passed unconstitutional bills to relieve the situation, again provided two other measures this year, the Davis-Fowler bills, **Governor Pinchot vetoed both bills July 12.** In his veto message the Governor said that lack of state revenues compelled him reluctantly to withhold his approval from the bills. The Legislature, he said, did not provide sufficient money for all meritorious appropriation measures and for that reason he was compelled to veto many bills.

WEST VIRGINIA

The Kentucky & West Virginia Power Co., Logan, is installing Westinghouse alternating-current motors and equipment to drive three new stocker clinker grinders. The A. C. motor circuits are provided with starting switches, series trip coils with inverse time-element attachments and low-voltage release coils.

It is reported that the **Pond Creek Pocahontas Coal Co. has taken over additional properties** in West Virginia. The mines, which are on the main line of the Norfolk & Western Ry., and which are in non-union territory, are said to contain approximately 5,000,000 tons of high grade Pocahontas coal.

J. C. Brydon and H. L. Gandy, president and executive secretary, respectively, of the National Coal Association, were among those in attendance at the meeting of the Virginia Coal Operators' Association at Norton.

Frank B. Carpenter, formerly electrical engineer with the West Virginia Engineering Co., has resigned and been appointed electrical engineer for the J. C. Sullivan mining interests of West Virginia.

The injunction granted by the late Judge A. G. Dayton, of the U. S. Court for the northern district of West Virginia, in the case of the West Virginia-Pittsburgh Coal Co. against John P. White et al. in 1913 **has been perpetuated** by Judge Dayton's successor, Judge W. E. Baker. Under the terms of the decree granted the United Mine Workers are enjoined from interfering with the employees of the West Virginia-Pittsburgh Coal Co. and are prohibited from attempting to organize the employees of the company.

The Marshall Coal Co. suffered a loss of about $45,000 when fire broke out in a conveyor at the company's mine about one mile west of Mount Clare, in Harrison County. The property destroyed includes one conveyor, conveyor shed and steam engine; one headhouse, head tipple and equipment; one supply house, including supplies; one company boarding house and three mine cars.

The new store building of the **West Virginia Coal & Coke Co.** which is being erected at Norton at a cost of $25,000, is now under roof and will be ready for occupancy by the middle of September. The company also has under construction a new office building at the same operation and that building is also under roof. It will cost $10,000. Plans are being formulated by this company for the rebuilding of the mine tipple at Junior, destroyed by fire late in May.

Early in July there was a strike of 260 miners of Cleveland & Morgantown Coal Co. plant at Pursglove, one of the largest in the Scott's Run field. After being out of the mines for about a week the strikers returned to work on July 14. It was agreed, it is understood, that the miners should return to work under the old working conditions. J. L. Studdard, sub-district vice-president, conducted the negotiations for the miners.

The Ohio County Fuel Co., affiliated with the American Gas & Electric and the West Penn Power companies, **has purchased 3,354 acres of coal land** in Richland district of Ohio County. The purchase price was $839,000. The acreage purchased was for the express purpose of insuring a supply of fuel for the Windsor power plant at Beech Bottom for the next half century. At the time the deed covering the sale of the property was filed, a mortgage creating the Union Trust Co. of Pittsburgh as trustee for the issue of $600,000 of gold serial bonds was filed, the proceeds to be used in completing payment for the tract. The properties purchased are underlaid with the Pittsburgh and Wheeling coal veins.

The Western Maryland & Tidewater Ry., constituting an outlet for several thousand acres of coal land south of Grantsville and connecting with the Baltimore & Ohio, **has been sold** by William E. Ambrose, of Cumberland, and his associates to the Morgart Coal Corporation, headed by William A. Morgart, which owns 7,000 acres of coal land in Garrett County, Md., and has a number of mines in operation. Mr. Morgart and his associates have not only purchased the railroad, but also the balance of the Jennings interests in Garrett County, including practically the entire town of Jennings. The road will in the future be known as the Casselman Valley R.R.

Suit instituted by the Marine Smokeless Coal Co. against the Norfolk & Western Ry. **may involve an interpretation of the Elkins Act**, for it is considered possible that it will eventually reach the U. S. Supreme Court. The suit was filed in the Circuit Court of McDowell County to recovering the amount expended, plus interest, in building a spur track up Davy Creek, covering a distance of about a mile and a half. The coal company sets forth the fact that after the spur was completed it was forced to deliver a deed for the spur to the railroad company and that by the terms of the deed the spur became a part of the main line of the railroad company, subject to all the laws and regulations applicable to common carriers and therefore was placed at the service of competing companies who paid no part of the construction cost and who were under no obligation to reimburse to any extent the plaintiff company. It is contended by the coal company that this amounts to a discrimination in law.

WASHINGTON

The Cambridge Coal Co., of Seattle, has incorporated with a capital stock of $300,000. The incorporators are E. M. Cushman, E. T. Pope and George A. Brooks.

The Beacon Coal Mines Co. has reorganized and hopes to reopen its mines near Seattle. W. J. Muirhead is president and general manager.

The East Fork Coal & Clay Co., of Seattle, has changed its name to the Everett-Fisher Coal Corp. and has increased its capital stock from $150,000 to $250,000.

The Sedro-Woolley Coal Co., of Bellingham, has been incorporated with a capital stock of $40,000 by H. W. Buzzard, M. C. DuVall, Elmer C. Saxon and William Seeger.

A dream for briquetting Washington coal came to an end recently when the equipment of the **Centralia Briquetting Co.,** of Centralia, was sold by the receiver for $2,560 to the Western Machine Exchange, of Aberdeen, which will dismantle the plant. The briquetting company was organized several years ago by L. A. Kingkinney to manufacture briquets by a process on which Kingkinney claimed to have a patent. The plant never operated on a commercial basis and Kingkinney was made defendant in numerous civil and criminal actions. His death occurred later. It is estimated that Centralians invested about $40,000 in the company. The sale did not include the building and grounds, which will be turned back to W. A. Davis, administrator of Kingkinney's estate.

Operators in Washington feel that the business of their properties in that state has been saved from practical extinction by the recent decision of the I.C.C. in the Western rate case. The commission made slight increases in coal freight rates between Utah and the Pacific coast instead of the reductions for which Utah prayed. Into Seattle rates on lump, nut and slack were increased 26c. a ton, and into Portland, Ore., for instance, the increases are 15c. on lump, 21c. on nut and 30c. on slack. Washington men contend that if Utah-to-the-coast reductions had been made there would have been little opportunity left for Washington to sell its coal and that sooner or later Washington mines would practically be driven out of business. This would give British Columbia coal a further chance to come down the coast, Washington contended before the commission.

WISCONSIN

The Chicago & North-Western Ry. is building a $30,000 coal hopper at the foot of Corcoran Avenue in Milwaukee.

A number of coal docks at Superior were damaged by a recent storm. The docks of the Clarkson Coal Co. and the Pittsburgh Coal Co. fared the worst. Three bridges of Dock No. 7, of the Pittsburgh company were badly twisted. The damage caused some delay in unloading vessels.

The Milwaukee Electric Railway & Light Co. has acquired the barge A. C. Tuxbury, a Great Lakes lumber-carrying vessel, and will use her in transferring coal from the docks to power houses on Milwaukee River. About 350,000 tons of coal is handled in this way during the course of a year.

Among the many resolutions forwarded by the Legislature of Wisconsin to Vice-President Coolidge for presentation to U. S. Senate was one embodying a request that legislation be enacted by Congress **requiring consignments of coal to be accompanied by statements showing the quality of the product.**

WYOMING

A lease on 1,000 acres of coal land near the Crosby mines at Lander was bought at auction at the Lander land office July 5 by the Big Horn Collieries Co. At least 20,000 tons a year must be extracted beginning the third year and at least $50,000 must be invested in developing the field.

WASHINGTON, D. C.

The Navy Department will receive bids until 10 a. m., July 31, for supplying and delivering 500 gross tons of bituminous mine-run coal to the Naval Experimental and Research Laboratory, Bellevue, D. C.

The Civil Service Commission has announced the opening of **examinations for valuation engineers and associate engineers.** It is the commission's desire to build up eligible lists from which the Treasury Department can choose engineers capable of examining coal properties for taxation purposes. The salaries range from $3,000 to $3,600 for associate engineers and from $3,600 to $4,800 for valuation engineers. The explanatory papers can be obtained on application to the Civil Service Commission at Washington.

CANADA

The Dominion Government by order-in-council has **continued the suspension of royalties** on coals mined in Yukon territory for an additional period of five years.

Eastern Canada Collieries, Ltd., has been granted a Dominion charter, with headquarters at Montreal. The authorized capital is $50,000 and the company is empowered to carry on business as operators and wholesalers.

The Norwegian steamship O. A. Knudsen, 3,352 tons, and the French boat Banba, 492 tons, both loaded with coal, were lost on the shores of St. Mary's Bay, N. F., on July 1. The crews of both vessels, which are reported to be total wrecks, landed safely.

The city of Toronto is buying bituminous coal for 90 per cent of its school fuel. Last winter it was obliged to do so and now that coal is preferred, at $7.53 a ton, in place of $15.50 for anthracite. The price paid for bituminous last winter was $9.80. Coke used cost last winter from $14 to $17.

Railway, government and coal men will attend the conferences to be held at Winnipeg, Manitoba, regarding freight rates on Alberta coal to Eastern Canadian points. The meeting is expected to take place in a few weeks. The object is to obtain a rate on Alberta coal that will permit it to be shipped into Ontario and sold at a price that will assure successful competition with imported coals.

Reports showing a satisfactory year's business were presented at the annual meeting in Fort Erie of the **Penn Canadian Fuel Co.,** with head office in Toronto. Among those present at the meeting were: L. W. McClennan, Toronto; W. R. Crothers, of Pittsburgh; F. H. Hoag, C. W. Moss, C. L. Couch and C. W. Smith, of Buffalo.

The Canadian National Ry. system is making a test of Alberta coal, a carload of coal from Drumheller having been brought to Stratford, Ont., arriving in good condition. It has been placed in storage under ordinary cellar conditions and will be examined in November to see how it stands storage. In case the result proves satisfactory the only factor of the problem remaining to be settled is that of price which will depend mainly on freight charges.

The Engineering Institute of Canada and the Canadian Institute of Mining and Metallurgy have both passed resolutions urging the fuel committee of the Canadian Senate and the House of Commons to consider the importance of appointing and providing funds for a committee of coal, transportation and equipment engineering experts to act in consultation with the engineering departments of the transcontinental railways to determine both scientifically and experimentally the greatest extent to which the cost of the transportation of coal from Alberta to Ontario can be reduced.

A conference of Canadian National and Canadian Pacific railway officials, coal operators, and representatives of the provincial government, was held at Edmonton, Alta., July 16, following which it was announced that a ton rate of $6 or $6.50 for the shipment of Alberta coal to Ontario was impossible. Premier Greenfield stated, however, that an arrangement had been effected whereby **shipment would be made within the next few weeks of 4,000 tons,** at a rate to be definitely decided later, which would be such as would allow Alberta domestic coal to reach Ontario in car lots at a competitive price. The rate at which this shipment would be made would be merely experimental. Jesse Gonge, representing the operators, said that furnace new coal could be sold at the mines for $4.50 per ton or over. Allowing $2.50 for dealers' profits, sacking and handling this, if, the freight charges were reduced to $6 to $6.50 per ton, as against the present $9 rate, would bring the retail price to $13 or $13.50 in competition with a present retail price for anthracite of $15,50.

William Sloan, minister of mines for British Columbia, has been engaged in making a tour of the underground workings of the coal mines of Vancouver Island. He has been accompanied by the new chief inspector of mines, George Wilkinson. Mr. Sloan found conditions as to the safety of the miners very satisfactory. Some of the workings places in No. 5 mine, South Wellington, and the Reserve mine, near Nanaimo, still are a source of trouble to the miners because of the sulphurous fumes given off by the coal. To this condition the minister paid special attention and **he has decided to call in an eminent bacteriologist and pathologist to see what can be done** to eliminate, or at least alleviate, the trouble. Dr. R. H. Mullin, a recognized authority on health work and industrial hygiene and head of the bacteriological and pathological department of the University of British Columbia, is to be asked to make this investigation.

Exaggerated statements have obtained circulation as to contracts entered into for a supply of Mexican coal for Canada, the amount contracted for having been placed as high as ten million tons. It is now stated that through arrangements made by Noel C. Wilde, Commercial Commissioner for Canada in Mexico, **600,000 tons of coal will be shipped from that country to Canada** during the coming seasons. Most of the coal is located in the district around Sabinas, in the State of Coahuila. Canadian boats will be used for transportation from the port of Tampico. The price is stated at $9 per ton f.o.b. Tampico.

With twenty-two hundred tons of Welsh anthracite coal on board, the Eastern Steamship Co.'s vessel "Judge Hart" has arrived in Toronto and is at the Century Coal Co.'s docks. It is the first of a series of shipments that are to come direct from Wales to Toronto.

According to a wire received by the Dominion Superintendent of Penetentiaries from an Edmonton coal company, he has been given a quotation of **$12.80, delivered** in the freight yards at Ottawa. This is almost **$4 lower than the rail price of Pennsylvania anthracite.**

Shipments of coal from the Nova Scotia collieries during June have been very heavy, with all collieries working full time, the output running from 22,000 to 24,000 tons per day. No. 7 colliery, Sydney Mines, which was idle all winter, is again producing, and No. 15 colliery, which was closed for several years, has been reopened and is being put in condition for operation. The Dominion Coal Co. is making a thorough test of coal mining machines, using different machines in different collieries.

MEXICO

A contract has just been awarded the Wilputte Coke Oven Corporation, New York, for the **installation of forty coke ovens,** with a complete byproduct and benzol plant at Rosita, in the State of Coahuila. Besides the oven plant, the plans include the installation of an up-to-date power house, a new shaft and hoist and a coal washer which has been designed under the direction of G. P. Bartholomew, general manager of the coal-mining department of the company.

Association Activities

Clarksburg Coal Club

That the outcome of negotiations between anthracite operators and miners and the possible bearing it may have on the bituminous situation is uppermost in the minds of bituminous operators was reflected in the general trend of discussion at recent meetings of the Clarksburg Coal Club, of Clarksburg, W. Va. T. J. Ryan, of the Hutchinson Coal Co., of Fairmont, discussed briefly what might be expected at a recent meeting of the club. J. M. McDonald, of Cincinnati, discussed recent revisions of freight rates on coal from Ohio and Kentucky, pointing out that already West Virginia operators feel the effects of the differential between West Virginia and Ohio sufficient to give Ohio operators a slight advantage. The new ruling, it was stated, enhances the advantage already held.

Obituary

George Hirsch, 67, owner and manager of the George Hirsch Coal Co., Milwaukee, Wis., died suddenly on Wednesday, June 27, 1923. He was one of the oldest jobbers and retailers of coal in Milwaukee.

Fred J. Cropsey, 56, for many years a coal manager in St. Paul, is dead. He was manager for the Carnegie Coal & Dock Co. for many years. He had been a resident of St. Paul for 30 years. A widow and three children survive him.

Publications Received

Mineral Production of Canada for the calendar year 1921. Dominion Bureau of Statistics, Mining, Metallurgical and Chemical Branch, Ottawa, Canada. Pp. 233; 6x9 in.; tables.

Mineral Resources of Alberta, Canada, 1922, Part I, covering Saunders Creek and Nordegg Coal Basins, by John A. Allan and Ralph L. Rutherford, University of Alberta, Edmonton, Alberta, Canada. Pp. 66; 7x10 in.; illustrated. Report on the geology of these basins, with geological map showing structure and areal distribution of the formations including the coal measures.

Progress of Investigations on Liquid-Oxygen Explosives, by S. P. Howell, J. W. Paul and J. L. Sherrick, Bureau of Mines, Washington, D. C. Technical paper 294. Pp. 91; 6x9 in.; illustrated; tables.

Manufactured Gas in the Home, by Samuel S. Wyer, associate in mineral technology, U. S. National Museum, Smithsonian Institution, Washington, D. C. Bulletin 102, Part 8. Pp. 24; 6x9 in.; illustrated. Insert in the front part of the bulletin shows model of how coal is transmuted into gas and delivered to the home.

Trade Literature

Type K Stoker. Combustion Engineering Corporation, Broad St., New York City. K-I. Four-page folder. This stoker underfeeds the coal, and dump grates may be installed in place of shaking grates where the burning characteristics of the coal used make it advisable. The outcome of a test at a plant operating three 150-hp. B. & W. boilers is given.

Catalog of Electrical Supplies, 1923-1924. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Pp. 1302; 8x11 in.; illustrated. The catalog is indexed according to subjects and to sections; it also has a style number and thumb index. A feature not included in previous catalogs has been added to the introductory section under the title "How this catalogue serves," wherein is listed apparatus of particular interest to mines, etc.

Traffic News

That the Monongahela Ry. will be able to move a much larger tonnage from the Monongalia field of West Virginia within a few months was the statement recently made by Colonel H. C. Nutt, president of the road. Discussing plans for additional coal-handling facilities, Col. Nutt said: "We expect to spend thousands of dollars in the Maidsville section during the summer and hope to complete the work within three or four months. When the work is completed travel along the highway paralleling the railroad will be much improved and district coal operators will find greater facilities for moving coal." He said that a steam shovel was in operation below Maidsville preparing for the double trackage to Lock 9, adding that the improvements in the Maidsville yards proper would be started within a short time.

Rates on coal from Standardville and other Utah points to Salt Lake City, held to have been in violation of the long and short-haul provision of the Interstate Commerce Act during the period of federal control, **are not in violation of the law,** in the opinion of J. O. Cassidy, an Interstate Commerce Commission examiner. In a tentative report to the commission he recommends that the complaint be dismissed. The complaint was brought by two corporations engaged in the retailing of coal and by a manufacturer of gas and certain byproducts of coal.

The Chicago & Northwestern R.R., was granted authority by the Interstate Commerce Commission July 20 to assume obligation and liability in respect to $4,755,000 of 7 per cent equipment trust certificates. The certificates are to be sold at not less than 96½ per cent of par and the proceeds used to procure additional equipment.

Appointment of Charles F. Wolcott, formerly connected with the Pennsylvania R.R., to be district manager of the Car Service Division of the American Railway Association, in Pittsburgh, Pa., has been announced by the Car Service Division. He assumed his new duties on July 15. The territory making up the Pittsburgh district includes the western half of Pennsylvania, western New York, northwestern Maryland, northern West Virginia and Ohio east of a line drawn from Parkersburg, W. Va., to Mansfield, Ohio, thence to Buffalo, N. Y. The district, however, does not include Buffalo, Niagara Falls or Suspension Bridge terminals.

The Lehigh Valley R.R. reports anthracite loadings for the first half of July amounting to 504,428 tons, the largest since 1920. Last year at this time the movement of coal was at a standstill because of the miners' strike. Loadings for June stood at 1,224,068 tons and this level is expected to be reached during July.

Hearing in Valuation Docket No. 235, in re tentative valuation of the properties of the Virginian Ry. Co. and the Virginian Terminal Ry. Co., assigned for Sept. 5 at Washington, D. C., before Examiner Pattison, has been cancelled and the case reassigned for Oct. 8, 10 a.m.; same place and examiner.

Clarence W. Huntington, president of **the Virginian Ry.,** in his annual report of the operations of that railroad for the year ended Dec. 31, 1922, says that the coal strike of last year affected the mining operations on that road at Eccles and west thereof, but the decrease in tonnage was more than offset by increased production in the other mines along the company's lines. At the close of the year there were 113 coal mines, not including wagon mines, in operation on the main line, branches and connecting lines in Virginia and West Virginia, of which eight began shipping during the year, and three additonal mines were under way. Four of the above mines were temporarily closed during the year on account of strike conditions. President Huntington says the bulkheads for the new pier being erected at Sewalls Point were practically completed at the close of the year. There was carried over the road during the year 7,397,025 tons of miscellaneous freight as compared with 6,376,648 tons in 1921. Revenue from coal and coke freight was $14,875,509.10 as compared with $13,743,394.58 the previous year. Net operating revenue for the year was $6,570,052.36 as compared with $5,618,628.97 in 1921, an increase of $951,423.39.

A total of 8,646 new freight cars were placed in service from June 15 to July 1 by the railroads of the country, according to the Car Service Division of the American Railway Association. This made a total of 79,240 new freight cars placed in service from Jan. 1 to July 1. The railroads also placed in service during the last half of June 158 new locomotives, making in all 1,998 put in service during the first six months this year. Of the 8,646 new cars installed from June 15 to July 1, 2,987 were coal cars. The railroads on July 1 also had 96,855 new freight cars on order. Of the number on order, 38,736 are coal cars. In addition, the railroads also had on order on July 1, 1,902 new locomotives.

Freight rates on coal from Ward, W. Va., to Ironton, Ohio, have been found to be unreasonable by the Interstate Commerce Commission. In a decision rendered in the case of the Dayton Malleable Iron Co. versus the Kanawha & Michigan Ry., the commission holds that for the future the rate will be unreasonable to the extent that it exceeds $2.14 per ton.

In connection with the $37,000,000 improvement program planned by the Chesapeake & Ohio Ry., **contracts have already been awarded to cover approximately 70 per cent of the $4,000,000 to be expended** on improvements in and near Huntington. One of the first improvements to be undertaken is the double tracking of the Big Sandy division at a cost of approximately $1,500,000, plans for which are already under way. Additional tracks and sidings are to be constructed on the main line between Handley and Russell. Additional yards, sidings and engine terminal facilities are to be provided in the Coal River district and $654,100 is to be expended on the Logan Division for additional yards and sidings. Between Handley and Russell $848,000 will be expended. Improvements to be made in the Coal River district will approximate $514,000. Improvements to be made to the Guyan Valley division are expected to increase materially the facilities of the company for handling a larger volume of coal from the Logan fields.

Products of mines to the extent of 149,197,528 tons were carried by the Class 1 railroads of the country during the first quarter of the current calendar year. This represents an increase of 23.41 per cent over the first quarter of 1922. During the first quarter of 1923 the products of mines contributed 53 per cent of the entire tonnage of original freight carried by the railroads. The tonnage contributed to the railroads by the mines of the country during the first quarter of 1923 is subdivided as follows:

	Tons
Anthracite	22,281,156
Bituminous coal	92,106,997
Coke	7,167,182
Iron ore	1,842,549
Other ores and concentrates	2,504,987
Base bullion and matte	175,446
Clay, gravel, sand and stone	18,997,997
Crude petroleum	1,830,724
Asphalt	322,375
Salt	743,457
Other products of mines	1,224,658
Total	149,197,528

Freight traffic in May was 39,597,582,000 net ton miles, the heaviest for that month in the history of the railroads, according to a report by the Bureau of Railway Economics. This was an increase of 2.7 per cent over the same month in 1917, when the previous record for that month was made. The daily average movement per freight car in May was 28.6 miles. Except in May, 1917, when an average of 29 miles was attained, this has never excelled in any month before and only once equaled, that being in the autumn of 1920. The average of 28.6 miles was an increase of three-fifths of one mile over the average for April. The average load per car in May was 28 tons, the highest for any May since 1917, when the compilation of these statistics began except for May, 1920, when the average was 28.2. The average for May this year was an increase of two-fifths of a ton over that for April. The program adopted by the railroads calls for a daily average movement per car of 30 miles and for the loading of all freight cars to maximum capacity in an effort to bring the average loading to 30 tons per car for the entire country.

Coming Meetings

The tenth annual **Tennessee First-Aid Contest and Miners' Field Day** will be held at Knoxville, Tenn., Aug. 4, in the Knox County Court Yard, under the auspices of the Tennessee coal operators, state mine inspectors and the U. S. Bureau of Mines, R. E. Howe, secretary of the Southern Appalachian Coal Operators Association, secretary-treasurer. J. M. Webb, of the U. S. Bureau of Mines, is instructing the first-aid teams.

The American Institute of Mining and Metallurgical Engineers will hold its annual meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary F. F. Sharpless, 29 West 39th Street, New York City.

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with **the International Safety and First-Aid Meet.** Secretary, Benedict Shubart, Denver, Colo.

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Calbreath, Washington, D. C.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.